NAVAL MEDICAL RESEARCH AND DEVELOPMENT COMMAND

# 1994 COMMAND HISTORY

Naval Medical Research and Development Command
National Naval Medical Center
Building 1, Tower 12
8901 Wisconsin Avenue
Bethesda, MD 20889-5600

## TABLE OF CONTENTS


Commanding Officer ..... 1
CAPT Thomas N. Jones, MSC, USN ..... 1
NMRDC Commanding Officers ..... 2

Background ..... 3
Naval Medical Research and Development Command ..... 3
Major Research Program Areas ..... 3
Combat Casualty Care ..... 4
Infectious Disease ..... 4
Diving and Submarine Medicine ..... 5
Environmental and Occupational Health ..... 5
Aviation Medicine and Human Performance ..... 5
Military Oral Health ..... 6
The National Marrow Donor Program ..... 6

CONUS Laboratories ..... 8
Naval Medical Research Institute ..... 8
Naval Medical Research Institute Toxicology Detachment ..... 9
Naval Aerospace Medical Research Laboratory ..... 10
Naval Health Research Center ..... 11
Naval Biodynamics Laboratory ..... 12
Naval Submarine Medical Research Laboratory ..... 13
Naval Dental Research Institute ..... 13
Naval Dental Research Institute Detachment ..... 14

OCONUS Laboratories ..... 15
Naval Medical Research Institute Detachment ..... 15
Naval Medical Research Unit No. 2 ..... 16
Naval Medical Research Unit No. 3 ..... 17

Highlights of NMRDC Research in 1994 ..... 19

CRADAS and Patents ..... 51
Cooperative Research and Development Agreements ..... 51
Patents ..... 56

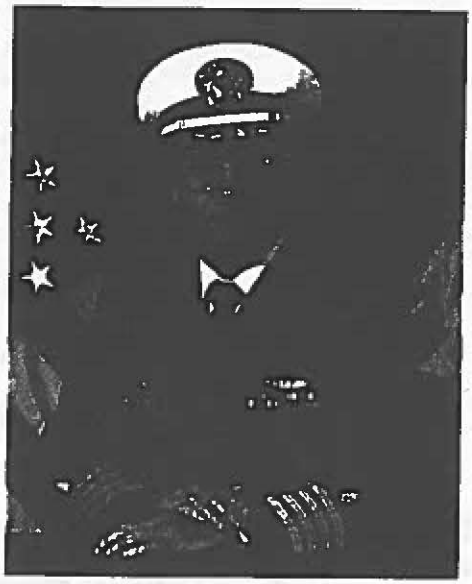
NMRDC Strategic Plan ..... 57
Mission ..... 57
Vision ..... 57
Guiding Principles ..... 57
Executive Summary ..... 58
Goals, Strategies and Objectives ..... 59

NMRDC Significant Events ..... 68

NMRDC Organization ..... 76

## COMMANDING OFFICER

### CAPT Thomas N. Jones, MSC, USN



CAPT T.N. Jones, MSC, USN

Captain Jones graduated in 1962 from Louisiana Polytechnic Institute with a B.A. degree in psychology and personnel management. In 1976 he earned an M.A. degree in experimental psychology from Baylor University. He received a direct commission in the U.S. Navy in December 1967. Following a six-month Aviation Training Program for Medical Service Corps officers at the School of Aviation Medicine, Naval Aerospace Medical Institute in Pensacola, FL, CAPT Jones was designated in June 1968 as a Naval Aerospace Experimental Psychologist.

Captain Jones' first assignment was as Head of Training Research for the Chief of Naval Air Training in Memphis (1969 - 1971) where he was a part of the Navy's first research and development effort to integrate computer technology into technical training systems. He was then transferred to the Naval Air Systems Command (Material Acquisition (Air-05)) where he served as a Human Factors Officer of crew station design for F-14/P-3/TACCMO weapons system from 1971 - 1973. He then had tours at the Naval Aerospace Medical Institute and the Naval Aerospace Medical Research Laboratory at NAS Pensacola, FL (1973 - 1977). During these tours, he served as Laboratory Coordinator for applied human performance research and aviation selection in air combat maneuvers for the Air Combat Maneuvering Range Training, NAS Miramar, San Diego, CA. During the period from 1977 - 1979 he earned his Ph.D. from the University of South Dakota in experimental/human factors psychology with a focus on modeling and simulation.

From 1979 - 1982 he served as Head of Human Factors Engineering for the Computer Software Directorate at the Pacific Missile Test Center in Point Mugu, CA. Then, from 1982 - 1985, Captain Jones was Program Manager for the Navy's Human Factors Engineering and Training and Simulation Technology Programs at the Naval Air Systems Command (Research & Technology (Air-03)). Captain Jones then transferred to the Office of Naval Research in Arlington, VA, where he served from 1985 - 1988 as Deputy Director of Applied Research and as Program Manager for Biomedical Research. At the Naval Medical Research and Development Command, Bethesda, MD (1988 - 1991), Captain Jones was Research Area Manager of the Aviation Medicine and Human Performance Programs and Specialty Advisor to the Surgeon General for Aerospace Experimental Psychology. Captain Jones' most recent assignment has been as Commanding Officer, Naval Health Research Center, San Diego, CA.

Significant professional experience includes staff consultant to the Navy's Revolution-at-Sea Program; member, Training Committee and the Tri-Service Aeromedical Research Panel (TARP); NMRDC Technical Representative to the Joint Technical Coordinating Group of the Armed Services Biomedical Research Evaluation and Management (ASBREM) Committee for Human Systems Technology; and consultant to the Chief, Bureau of Medicine and Surgery on

Navy and Marine Corps aviation selection matters. Captain Jones served as Co-chairman of the North Atlantic Treaty Organization/Advisory Group for Aerospace Research and Development (NATO/AGARD) Working Group-15 (Tactical Mission Planning Systems), and as the U.S. Navy representative to the Aerospace Medical Panel of the NATO/AGARD.

Captain Jones' decorations include the Legion of Merit, the Meritorious Service Medal (gold star in lieu of second award), the Navy Commendation Medal, the National Defense Medal with bronze star, and a Navy Unit Commendation. His associations with professional and service organizations have included the Aerospace Medical Association, Human Factors Society, and the American Psychology Association. He is an active member of the scientific community and has made numerous presentations at Armed Services professional and international meetings.

Captain Jones has two daughters, Kayla D. Jones and Susan M. Smith.

## NMRDC Commanding Officers

| | |
|---|---|
| CAPT T.N. Jones, MSC, USN | 1994 - present |
| CAPT E.T. Flynn, MC, USN | 1991 - 1994 |
| CAPT J.N. Woody, MC, USN | 1988 - 1991 |
| CAPT W.M. Houk, MC, USN | 1985 - 1988 |
| CAPT J.F. Kelly, DC, USN | 1980 - 1985 |
| CAPT J.D. Bloom, MC, USN | 1977 - 1980 |
| CAPT E. Brodine, MC, USN | 1974 - 1977 |

## Naval Medical Research and Development Command

National Naval Medical Center
Building 1, Tower 12
Bethesda, Maryland 20889-5606

Key Personnel

| Code | Title | Name |
|---|---|---|
| 00 | Commanding Officer | T.N. Jones, CAPT, MSC, USN |
| 09 | Executive Officer | R.G. Hibbs, CAPT, MC, USN |
| 00A | Command Master Chief | C.D. McWilliams, HMCM, USN |
| 01 | Director, Resources and Finance | S.L. Hayes, LCDR, MSC, USN |
| 02 | Director, Administration | J.C. McDonough, CDR, MSC, USN |
| 03 | Director, External Relations | T.J. Singer, CAPT, MSC, USN |
| 04 | Director, Research and Development | R.C. Carter, MSC, USN |

The Naval Medical Research and Development Command (NMRDC) is committed to providing the biomedical research needed to enable the men and women of the Navy and Marine Corps to perform their mission safely and effectively. NMRDC scientists conduct basic, clinical, and field research directly related to military requirements and operational needs. Current studies focus on military recruits, special training groups, and personnel in the surface, submarine, air, and amphibious warfare communities.

NMRDC laboratory facilities equal those at modern academic and industrial institutions. Beyond this capacity, a number of NMRDC laboratories have unique test equipment and specialized software for pursuing research on current and projected biomedical problems. Also, research is supported in other Navy laboratories as well as in partnership with the Army and Air Force and with other Federal agencies. Research in non-government laboratories is promoted through an active collaborative research and technology transfer program that develops cooperative research and development agreements with universities and private industry to ensure that research products from our laboratories benefit the entire country.

Navy-supported medical research efforts have influenced the civilian practice of medicine, assisted the Ministries of Health in developing nations, and provided technology for other Federal initiatives.

### Major Research Program Areas

NMRDC's seven research program areas focus on operational medicine, which is occupational medicine practiced in a military environment. Operational medicine is very different from traditional medical care provided at military and civilian hospitals and clinics. Operational medicine specifically focuses on the physical readiness, performance, and safety of Sailors and Marines who train and work in a wide variety of military occupations around the world.

A headquarters staff officer is assigned as the Research Area Manager for each program area. The Research Area Managers are the central contact points between the laboratories, where the research takes place, and headquarters, where budget decisions are made and research planning and execution policy is established. The Research Area Managers manage both intramural and extramural research activities. The in-house research efforts are complemented by a contract and grant program with universities and private industry.

## Combat Casualty Care

The Combat Casualty Care Program, NMRDC's largest research program, directs research with results that enhance fleet health care, augment field treatment capabilities, and improve the medical logistics necessary to support Navy and Marine Corps personnel. On-going projects focus on developing and incorporating advanced medical capabilities into each echelon of combat medical care.

To improve combat casualty care, researchers are developing technologies to enhance recovery from combat-related illnesses and injuries. Scientists are developing techniques for acclimating personnel to extreme environmental temperatures. Advancements are being made in developing universally transfusable human red blood cells and in evaluating the effectiveness of blood substitutes. Improved procedures are being developed for enhancing the recovery of injured hematopoietic and immune systems with the development of therapeutic reagents and with the use of recombinant growth factors and cytokines.

Current programs focus on:

- Field usable diagnostics
- Hematopoietic stem cells
- Immune system recovery
- Septic shock
- Patient identification and management aids
- Combat medical devices
- Blood products
- Blood substitutes
- Wound healing
- Hot/cold weather injuries
- Medical readiness planning tools
- Musculoskeletal injury

## Infectious Disease

With Sailors and Marines deployed around the world, mission-specific medical research on infectious diseases continues to be one of the Navy's highest priorities. Deployed personnel can be exposed to endemic diseases, many of which are rarely, if ever, encountered by physicians in the United States.

For this reason, the Navy has developed a series of strategically located overseas laboratories to study disease threats. These laboratories conduct basic, clinical, and field research related to the health and operational readiness of Sailors and Marines deployed to specific areas overseas. Each laboratory is capable of deploying highly trained personnel and state-of-the-art laboratory diagnostic capabilities to any remote location. These laboratories, teamed with strong basic-science and technology-based laboratories in the United States, develop methods to prevent, diagnose, and treat the many tropical diseases encountered during military operations. The results of this continuous research has been key to the success of many military missions.

## BACKGROUND

### Diving and Submarine Medicine

The Diving and Submarine Medicine Program represents a Navy-unique center of excellence. Current research focuses on solutions to medically-related problems identified by the Navy's submarine, diving, explosive ordnance disposal, and special warfare communities.

In response to specific community-identified problems, scientists are conducting research in the biomedical and behavioral aspects of the submarine and diving environments. These include efforts focused on submarine rescue, deep water recovery, underwater construction, explosive ordinance disposal, and other diving scenarios. Current research also examines the areas of sonarman performance, qualifications for submarine duty, and methods to improve crew health and safety.

Special warfare research focuses on personnel performance, performance enhancement, and exercise-related injuries. Capabilities include the major Navy facility providing therapy for decompression sickness and cerebral arterial gas embolism.

This facility also provides hyperbaric treatment for gas gangrene, carbon monoxide poisoning, and other diseases responsive to hyperbaric oxygen therapy.

### Environmental and Occupational Health

In certain operational environments Sailors and Marines are at risk of exposure to physical, chemical, and biological hazards that may threaten their health and degrade operational performance. Techniques for understanding the mechanisms of injury and disease associated with these environments are being developed to reduce or prevent injury, improve safety, and optimize mission effectiveness. Scientists are focusing on Navy-specific operational scenarios to establish effective standards for occupational safety and health, environmental protection, damage control, and fire prevention. In determining exposure limits, researchers are concentrating on areas of study that include heat, noise, vibration, atmospheric contaminants, and various forms of electromagnetic radiation including lasers. The resulting research data are used to develop models predicting human exposure consequences in actual use situations, to tailor exposure limits during exposure conditions and to recommend medical surveillance and treatment guidelines.

Researchers also are investigating the effects of life style factors including obesity, hypertension, smoking and drug use on military readiness. Other studies focus on cancer risk, accidental injury, and the health care needs of military women in the fleet and during combat operations.

### Aviation Medicine and Human Performance

The Aviation Medicine and Human Performance Program plays a vital role in solving medically related problems and in reducing the hazards to human safety that are unique to the naval aviation operational environment. The diverse missions of the Navy require Sailors and Marines to be strapped into a fixed winged aircraft that is catapulted off of and trapped back aboard aircraft carriers. Likewise, helicopters must lift off from and return to small "moving" landing areas on various ships underway. All must do this in most sea states and during daylight as well as night time conditions. The operational tempo, mission, tactics, and environment require that aviators be selected, trained, and equipped to maintain operational readiness throughout a career.

There are several objectives of the research and development efforts conducted in this program area. The first is to improve selection test batteries and medical screening standards for evaluating Navy and Marine Corps candidates for specific duties and to enhance evaluations of fully trained personnel for continued duty. The second is to reduce injury and operational hazards for combat personnel performing specific missions. A major focus of these efforts is on aeromedicaly related problems dealing with acceleration, spatial awareness, spatial disorientation, and impact injury prevention. The last is to enhance physical safety during night operations, where unaided human visual performance is severely impaired, through the understanding of psychophysical and neurophysiological operating characteristics of the visual system.

Research products support fleet operations, aircrew selection, and provide human performance and physiological requirements for the designers and developers of aircraft systems and subsystems. These products are also useful for personnel who operate in non-aviation related extreme environments (e.g., special forces).

Current Programs focus on:

- Improved aviator selection test battery.
- Development of a vestibular function test (Unilateral Otolith Function Test) for evaluating pilot applicants.
- Demonstration of new physiological and neurophysiogical approaches to the dynamics of spatial orientation.
- Development of prototype tactile interfaces to improve situation awareness in flight environments.
- Fielding of training and design recommendations to combat the effects of night vision device induced visual distortion on safety of flight.
- Performance evaluation of enhanced night vision devices and training aids.

## Military Oral Health

Dental problems significantly impair operational readiness and sustainability. Navy and Marine Corps personnel can find themselves in operational settings with no immediate access to dental care where dental problems could jeopardize a multi-million dollar mission. These military-unique situations require dental research to characterize patient populations, identify better diagnostic and risk assessment techniques, develop better methods of prevention and treatment, and improve the dental health care delivery system.

Currently, researchers are investigating problems such as dental emergencies in operational environments, use of dental sealants on recruits, third molar emergencies, risk assessment by corpsmen, and systematic evaluation of disease progression prior to treatment. Navy dental research is the best, by far the most responsive, and most cost-efficient way to address these important operational problems.

## The National Marrow Donor Program

Bone marrow transplantation is a very successful method of treating bone marrow suppression caused by malignancy, radiation, or chemical injury. Prior to the Navy's involvement in the National Marrow Donor Program, the only realistic possibility for a marrow donor was being an HLA (Human Leukocyte Antigen) matched sibling. Only 30% of needy patients have matched siblings.

## BACKGROUND

With the appropriate facilities and personnel for bone marrow transplantation research, the Navy was tasked by Congress in 1990 to initiate research addressing tissue typing for patients without related donors and to develop an active Department of Defense recruitment program. That was the beginning of the Navy's C.W. "Bill" Young Marrow Donor Recruitment and Research Program. New technology developed by Navy scientists is revolutionizing the way tissue typing is performed by permitting clinical analysis of an individual's genetic makeup. From the Navy laboratory to the clinic, technology to define HLA type by directly analyzing HLA genes from each donor is now a reality. The DNA for testing is obtained from a tiny sample of each donor's chromosomes, currently from blood cells but potentially from hair follicles or scrapings from the inside of the mouth. Polymerase chain reaction technology is used to produce billions of copies of the short segment of DNA which codes for the specific protein structures that dictate HLA type. The precise nucleic acid sequences of many of the HLA types have been discovered. The technology is rapidly progressing to increase the number of HLA genes that can be tested. Automation is being introduced to increase capacity.

Because of these research advancements and recruiting efforts, the National Marrow Donor Program has a database of over one million volunteer marrow donors and now there is a better chance of success for patients seeking unrelated donors.

## Naval Medical Research Institute

National Navy Medical Center
Bethesda, MD 20889-5055

Key Personnel

| Code | Title | Name |
|---|---|---|
| 00 | Commanding Officer | R.G. Walter, CAPT, DC, USN |
| 09 | Executive Officer | D.A. Ehrhardt, CAPT, MSC, USN |
| 00A | Command Master Chief | P.N. Granados, HMCM, USN |
| 01 | Director, Administration | B.J. Auth, CDR, MSC, USN |
| 00C | Comptroller | D.E. Brandt, LCDR, MSC, USN |
| 04 | Chief Scientists | R.J. Hartzman, CAPT, MC, USN<br>L.D. Homer, MD, PhD<br>C.H. June, CDR, MC, USN<br>C.G. Hayes, PhD<br>R.W. Gaugler, CAPT, MSC, USN |

From modest beginnings in 1942, with studies in vaccine testing and investigations of tropical and parasitic diseases, the Naval Medical Research Institute (NMRI) has evolved into the Navy's largest biomedical research facility. Today NMRI conducts research in a wide variety of biomedical disciplines including diving medicine, environmental medicine, immunology and transplantation, combat casualty care and infectious diseases.

Since 1942, NMRI has expanded dramatically to embrace many disciplines of medical research. The world's first tissue bank was organized as a component in 1949; America's first astronauts received part of their training at NMRI; early versions of the heart-lung machine were perfected with the help of NMRI scientists; NMRI researchers developed the freezing techniques that made sperm banks possible; and one of the world's most sophisticated complexes for hyperbaric studies began operations in 1981.

Though the focus of specific research conducted at NMRI has shifted many times over the years, the basic goal remains the same: the protection and enhancement of the health, safety, and efficiency of Sailors and Marines. Located on the grounds of the National Naval Medical Center, Bethesda, MD, NMRI shares a campus with the National Naval Medical Center, the Armed Forces Radiobiology Research Institute, and the Uniformed Services University of the Health Sciences. NMRI is located across the street from the National Institutes of Health. There are many government, corporate, and academic research facilities within a 35 mile radius of NMRI. These include the Center for Vaccine Development at the University of Maryland, Baltimore campus; the U.S. Army Medical Research Institute for Infectious Diseases at Ft. Detrick, MD; and the Walter Reed Army Institute for Research, Washington, DC.

NMRI has three detachments. One is a toxicology detachment at Wright-Patterson AFB, OH, where potentially hazardous materials are

investigated. The second is an infectious diseases detachment in Lima, Peru, where studies in tropical medicine are carried out in collaboration with the

Peruvian Navy. The third detachment is with the U.S. Army Medical Research Unit, Nairobi, Kenya, investigating Malaria vaccine development.

## Naval Medical Research Institute Toxicology Detachment

**Building 433**
**2612 Fifth Street**
**Wright-Patterson AFB, OH 45433-7903**

Key Personnel

| Code | Title | Name |
|---|---|---|
| | Officer-in-Charge | D.A. Macys, CAPT, MSC, USN |
| | Director, Administration | D.V. Hedges |
| | Detachment Military Officer | N. Lacy, CDR, MSC, USN |
| | Senior Scientist | R.I. Carpenter, PhD, DABT |
| | Senior Enlisted Advisor | M.S. Buring, HM1, USN |

NMRI's Toxicology Detachment (TOXDET), the Navy's only toxicology research laboratory, was established in 1976 at Wright-Patterson AFB, near Dayton, OH. This collocation with the Air Force's lead laboratory in toxicology allows Navy researchers to work in a unique facility designed for continuous inhalation exposure. The major portion of the facility consists of eight very large exposure chambers known as the Thomas Domes. The domes are individually airlocked domes, built as a set of four, for three exposure levels and one control level.

Current TOXDET programs focus on occupational safety and health, environmental protection, and damage control and fire prevention. The resulting research data are used to develop models predicting human exposure consequences in actual use situations, to tailor exposure limits to exposure conditions and to recommend medical surveillance and treatment guidelines. Research at TOXDET means precise evaluation of hazards and therefore better decisions regarding how to control those hazards. The goal of TOXDET research is to minimize human health risks while also minimizing operational impacts. TOXDET also serves in a consultant role to many operating units of the Navy.

## Naval Aerospace Medical Research Laboratory

Naval Air Station
Pensacola, FL 32508-1046

Key Personnel

| Code | Title | Name |
|---|---|---|
| 00 | Commanding Officer | A.J. Mateczun, CAPT, MC, USN |
| 00A | Executive Officer | J.C. Patee, CAPT, MSC, USN |
| 00B | Chief Scientist | J.D. Grissett, PhD |
| 00C | Senior Enlisted Advisor | R.A. Rich, HMCS(AW), USN |
| 01 | Head, Research Support Department | D. Hackett, LT, MSC, USN |
| 13 | Head, Finance Department/ Comptroller | D. Hackett, LT, MSC, USN |
| 02 | Head, Research Department | J.O. de Lorge, PhD |

The Naval Aerospace Medical Research Laboratory (NAMRL) in Pensacola, Fl is the Navy's principal research center in aerospace medicine. The results of long-term NAMRL research projects, such as the "Thousand Aviator Study" and the "Repatriated Prisoner of War Program", have led to revised selection standards and provided the basis for further study. Renowned for pioneering research in vestibular physiology, NAMRL continues to study the causes of disorientation. NAMRL scientists have designed unique motion-based devices to develop motion-sickness desensitization procedures. Experimental protocols developed at NAMRL were used to perform the first assessment of the transdermal scopolamine patch, which is widely used today in the private sector for motion sickness. NAMRL's discovery of vestibular reactions to "off-vertical rotation" prompted international scientific study. The research results are being incorporated into clinical neuro-otological assessment strategies at medical centers worldwide.

NAMRL scientists are studying the human-machine interface and developing new selection criteria and testing protocols. Current projects focus on end products such as performance degradation countermeasures for sustained operations and validation of multidisciplinary research protocols for drug therapy. Other project areas include research on the effects of lasers on visual performance, dynamic anthropometry, and dosimetry methods for measuring radiation absorption from shipborne high power radio antennas. Data collection in the operational environment will be expanded by using the mobile field laboratories with automated testing modules.

NAMRL scientists also study potential environmental hazards. Researchers have developed unique dosimetry procedures and apparatus, several of which have been patented for commercial applications. NAMRL's expertise in radiofrequency dosimetry also generated several inventions to combat cold exposure. One device applies radiofrequency energy to rewarm hypothermia victims. Other

devices are under development to warm the hands and feet of divers working in cold water.

NAMRL played a significant role in early space flight and NAMRL scientists currently make up part of the planning team for a proposed manned mission to Mars. In addition, NAMRL has duplicated parts of the space shuttle flight profile in order to better assess the vestibular effects experienced by the crew.

## Naval Health Research Center

P O Box 85122
San Diego, CA 92186-5122

Key Personnel

| Code | Title | Name |
|---|---|---|
| 00 | Commanding Officer | L.M. Dean, CAPT, MSC, USN |
| 01 | Executive Officer | T.J. Contreras, CAPT, MSC, USN |
| 02 | Scientific Director | S. Nice, PhD |
| 03 | Director, Administration | M. McCormack, LCDR, MSC, USN |
| 04 | Director, Finance/Comptroller | J.E. Bennett |
| 00A | Senior Enlisted Advisor | F. Finua, HMC, USN |

The Naval Health Research Center (NHRC) in San Diego, CA, studies the medical impact of operational environments on the physical and emotional fitness of Sailors and Marines. NHRC is internationally recognized for research related to health and performance and works closely with the WESTPAC Fleet and the Marine Corps. Areas of research include preventive and clinical psychiatry, neurology, biochemistry, psychophysiology, exercise physiology, and social psychology. NHRC successes include studies of adaptation by military personnel wintering-over in the Antarctic and investigations of life style factors impacting military readiness including obesity, hypertension, smoking, and drug use. Other areas include studies of cancer risk, accidental injury, and the health care needs of women aboard ship.

The sleep laboratory at NHRC, the main DoD laboratory for sleep studies, investigates the effects of sleep loss and abnormal work and rest cycles on individual performance. Other NHRC facilities include a psychophysiology laboratory at the Naval Hospital, San Diego; an exercise physiology laboratory at the Naval Training Center, San Diego; and an experimental laboratory at the Marine Corps Mountain Warfare Training Center, Pickle Meadows, CA.

## Naval Biodynamics Laboratory

P O Box 29407
New Orleans, LA 70189-0407

Key Personnel

| Code | Title | Name |
|---|---|---|
| 00 | Commanding Officer | R.W. Rendin, CDR, MSC, USN |
| 01 | Executive Officer | L. Schoenberg, CDR, MSC, USN |
| 10 | Scientific Director | M.S. Weiss, PhD |
| 302 | Director, Facilities | M.N. Buford |
| 40 | Director, Manpower/Administration | K. Rice, LT, MSC, USN |
| 50 | Director, Finance/Comptroller | S. Garcia |

The Naval Biodynamics Laboratory (NBDL), located at the NASA Michoud Assembly Facility in New Orleans, LA, is the primary Navy laboratory conducting biomedical research on the effects of mechanical forces encountered in Navy aircraft and ships. The results of this research, using human research subjects and specially designed manikins, establishes human tolerance limits and develops methods to minimize the adverse effects of these forces. NBDL is a unique Navy laboratory having the only billets for human research volunteers, whose standard tour length is 18 months.

Among NBDL's unique facilities are two impact accelerators: a nitrogen powered horizontal accelerator capable of delivering 225,000 pounds of thrust propelling a payload along a 200 meter indoor track, and a similar vertical accelerator capable of delivering 40,000 pounds of thrust with a 13 meter maximum range. NBDL operates the Navy's only ship motion simulator (SMS), capable of simulating ship motions in conditions up to sea state five with three degrees of freedom: heave, pitch, and roll. The SMS and a tri-axial tilt/rotational chair incorporating visual effects are used to study the effects of motion on human physical and mental performance.

Also, the laboratory has a computer link to an aircraft mishap database maintained at the Naval Weapons Engineering Activity, Washington, DC. Accessing these data, derived from Flight Surgeon Reports, enables the laboratory to integrate impact injury research with operational safety concerns in naval aviation.

## Naval Submarine Medical Research Laboratory

Box 900
Naval Submarine Base, New London
Groton, CT 06349-5900

Key Personnel

| Code | Title | Name |
|---|---|---|
| 00 | Commanding Officer | P.K. Weathersby, CAPT, MC, USN |
| 01 | Executive Officer | M.D. Curley, CDR, MSC, USN |
| 02 | Director, Administration/Facilities | S. Blacke, LCDR, MSC, USN |
| 03 | Senior Enlisted Advisor | S. Featherston, HMCM, USN |
| 07 | Director, Finance/Comptroller | G. Sack, LT, MSC, USN |

The Naval Submarine Medical Research Laboratory (NSMRL) is the Navy's only submarine platform-designated medical research and development laboratory conducting basic and applied research in the biomedical and behavioral sciences aspects of submarine, hyperbaric, and diving environments. Scientific fundamentals are being established for the continued expansion of the physiological limits and capability of man in the sea, whether in the diving or closed-habitation mode. Greatly aiding investigators is an extensive array of equipment, including hyperbaric and anechoic chambers and fully equipped laboratories for research in respiratory physiology, biochemistry, vision, audition, and human factors engineering. Human performance on sonar and combat systems is currently a major program at NSMRL.

## Naval Dental Research Institute

Building 1-H
Great Lakes, IL 60088-5259

Key Personnel

| Code | Title | Name |
|---|---|---|
| 00 | Commanding Officer | S.A. Ralls, CAPT, DC, USN |
| 00B | Command Master Chief | B.I. Bozant, SKCM(SW), USN |
| 03 | Scientific Director | L.G. Simpson, PhD |
| 00A | Director, Administration | P.F. Dubose-Lardy, LCDR, MSC, USN |
| 04 | Head, Clinical Investigations | D.M. Meyer, CAPT, DC, USN |
| 23 | Director, Finance | B.I. Bozant, SKCM(SW), USN |
| 00C | Safety Manager | E.D. Pederson |

The Naval Dental Research Institute (NDRI) at the Naval Training Center, Great Lakes, IL, conducts research in fleet and field dentistry and is the only DoD laboratory dedicated to combat Dentistry and Oral Disease Research. Scientists are developing and evaluating methods to prevent or intercept acute dental conditions and improve dental readiness.

The identification of military patients at high risk for dental diseases is addressed through the development of rapid diagnostics assays involving monoclonal antibodies, DNA probes, and microbial enzymatic indicators. Dental emergencies in military personnel are addressed by the epidemiologic assessment of dental treatment needs, evaluation of methods to assist in the diagnosis and documentation of orofacial diseases, and evaluation of preventive and treatment methodologies to promote dental wellness.

## Naval Dental Research Institute Detachment

Naval Dental School
National Naval Dental Center
Bethesda, MD 20889-5077

Key Personnel

| Title | Name |
|---|---|
| Officer-in-Charge | A.C. Richardson, CAPT, DC, USN |
| Division Officer | L.I. Giambarres, LCDR, MSC, USN |
| Senior Enlisted | D.L. Jones, DTC, USN |

The Naval Dental Research Institute (NDRI) Detachment-Bethesda is located at the Naval Dental School (NDS) at the National Naval Dental Center, Bethesda, MD. NDRI Detachment is responsible for coordination and guidance of NDS resident research performed as part of postgraduate specialty education, and for support of staff research projects. Although the primary mission of the NDS involves meeting the requirements for postgraduate specialty training, resident research efforts are channeled into areas which have the most potential for benefit to the Navy dental community.

Three major on-site collaboration efforts are underway with the National Institute of Dental Research, the Molecular Epidemiology and Disease Indicators Branch of the National Institute of Standards and Technology, and the National Aeronautics and Space Administration (NASA) Office of Technology Utilization.

## Naval Medical Research Institute Detachment

Unit 380
Lima, Peru
APO AA 34031

Key Personnel

| Code | Title | Name |
|---|---|---|
| 00 | Officer-in-Charge | M. Wooster, CDR, MSC, USN |
| 01 | Administrative Officer | D.M. McClendon, LT, MSC, USN |
| 00A | Senior Research Scientist | D.M. Watts, PhD |
| 01E1 | Administrative Assistant | R. Phillips, HMC, USN |

The Naval Medical Research Institute Detachment (NMRI-DET) began activities in 1983 under a joint country-to-country agreement initiated by the Surgeon General of the Peruvian Navy to further research in infectious diseases in Peru, particularly as it relates to operational settings. NMRI-DET is the only U.S. Navy medical facility in South America. The detachment is located on the grounds of the Peruvian Navy Hospital in Lima and consists of a laboratory and administrative building and an animal facility. In addition, there is a satellite laboratory at the Peruvian Navy Hospital in Iquitos, in the Peruvian sector of the Amazon.

There is daily contact between detachment personnel and representatives of various Peruvian groups such as the Ministry of Health; Surgeons General of the Navy, Army and Air Force; and many Peruvian universities, hospitals and clinics. Many civilian organizations in Peru also collaborate with the detachment. The most notable ones in Lima include the National Institutes of Health, the Cayetano Heedia Tropical Medicine Institute (Instituto Alexander Von Humboldt), the San Marcos University Tropical Medicine Institute, and numerous hospitals such as the Neoplastics Center, Santo Toribio, Almenara, Loayza, Dos De Mayo, Children's Hospital and many others.

The detachment conducts research on the diagnosis and treatment of infectious diseases of military importance in the regions of South and Central America. Facilities include fully equipped laboratories for the study of virology, bacteriology, parasitology, entomology and tropical medicine.

## Naval Medical Research Unit No. 2

Box 3 Unit 8132
Jakarta, Indonesia
FPO AP 96520-5000

Key Personnel

| Code | Title | Name |
|---|---|---|
| 00 | Commanding Officer | F.S. Wignall, CAPT, MC, USN |
| 09 | Executive Officer | R.P. Olafson, CAPT, MC, USNR |
| 01 | Administrative Officer | R.J. Mulvanny, LCDR, MSC, USN |
| 07 | Director, Finance/Comptroller | B.E. White, LT, MSC, USN |

The U.S. Naval Medical Research Unit No. 2 (NAMRU-2) began activities in 1968 when the Indonesian Ministry of Health (MOH) requested assistance in controlling a plague epidemic. The success of that collaborative effort resulted in the MOH's invitation for NAMRU-2, then located in Taipei, Taiwan, to remain in Jakarta for the purpose of developing research activities of mutual interest to Indonesia and the U.S. Navy. NAMRU-2 was officially established when laboratory space was provided by the MOH in 1970.

The geographic location offers researchers access to a 3,500 mile archipelago astride the equator in Southeast Asia. The majority of tropical infectious diseases of military importance occur in Indonesia. Distinctly Asian diseases occur on the western islands of the archipelago and diseases more typical of the South Pacific region occur on the eastern islands, especially Irian Jaya. Almost all infectious diseases of military importance can be found within the Indonesian archipelago: malaria, dengue fever, typhoid, cholera, leptospirosis, filariasis and Japanese encephalitis as well as other hemorrhagic fevers, enteric pathogens, viruses and parasites.

## Naval Medical Research Unit No. 3

PSC 452 Box 5000
Cairo, Egypt
FPO, AE 09835-0007

Key Personnel

| Code | Title | Name |
|---|---|---|
| 00 | Commanding Officer | R.G. Hibbs, CAPT, MC, USN |
| 01 | Executive Officer | S.M. Mapes, CDR, NC, USN |
| 00B | Command Master Chief | T.A. Thurman, HMCM, USN |
| 10 | Head, Administrative Department | |
| 20 | Head, Finance Department/ Comptroller | R.N. Baylon, LT, MSC, USNR |
| 30 | Head, Research Sciences Department | B.R. Merrell, LCDR, MSC, USN |
| 40 | Head, Public Works Department | N.F. Florez, LT, CEC, USNR |

The United States Typhus Commission was established by presidential order in 1942 to develop effective prevention and control measures for typhus. A research laboratory staffed by American scientists and technicians associated with the Abbassia Fever Hospital in Cairo, Egypt was established to address this problem among troops in North Africa. The Typhus Commission laboratory played a major role in adverting a serious typhus outbreak during and following World War II. After the war, the Egyptian Government invited the Navy to continue collaborative studies with Egyptian scientists focusing on endemic tropical and subtropical diseases. In response to this request, the U.S. Naval Medical Research Unit No. 3 (NAMRU-3), Cairo, Egypt was formally established by the Secretary of the Navy in 1946. NAMRU-3 has been in continuous operation since 1946 despite periods of tension, and a seven year lapse of U.S.-Egyptian diplomatic relations (1967 - 1973).

NAMRU-3's professional staff possesses expertise unique in the Northeast African region. NAMRU-3's recognized excellence in epidemiology and all aspects of retroviral diagnostics resulted in Command designation by the World Health Organization as the diagnostic reference center for AIDs in the Eastern Mediterranean region. The strength of NAMRU-3's basic molecular and immunological studies of schistosomiasis resulted in the selection of the unit as the USAID supported American collaborating center for the development of improved diagnostics and candidate vaccines for the strains of S. mansoni and S. haematobium associated with human disease in Egypt.

NAMRU-3 conducts a multi-faceted basic, clinical, and field research program relating to the health and operational readiness of military personnel assigned or deployed to Southwest Asia or Africa. Of particular interest are those infectious diseases endemic to the region which may adversely impact troops during military operations within the area. The unit is fully capable of deploying both highly qualified field-trained personnel and state-of-the-art field-applicable

laboratory diagnostic capabilities to any remote area in the region. In addition, the unit is a

state-of-the-art medical research facility equipped to conduct even the most technologically advanced basic science research.

## Change Of Command And Retirement At NMRDC

CAPT Thomas N. Jones, MSC, USN relieved CAPT Edward T. Flynn, Jr., MC, USN, as Commanding Officer of the Naval Medical Research and Development Command.

CAPT Flynn, one of the Navy's most knowledgeable experts in diving physiology, retired on 10 June 1994 after 27 years of service.

Speaking at the ceremony, RADM Hugh P. Scott, MC, USN, Director, Medical Resources, Plans and Policy Division, Office of the Chief of Naval Operations commented on CAPT Flynn's very successful and highly productive naval career which included duties involving the full gamut of diving medical research, teaching, the specialty practice of anesthesia, and executive medicine.

RADM Scott highlighted CAPT Flynn's work at the Naval Medical Research Institute prior to his assuming command of NMRDC, "During his years at the Naval Medical Research Institute, CAPT Flynn rose through the ranks from bench scientist, to division head, to department head, and ultimately to the prestigious Chair of Science. During his watch, CAPT Flynn performed studies on a wide range of diving medical related topics including: the pathogenesis of decompression sickness and arterial gas embolism, the neurological basis of high pressure nervous syndrome, thermal protection of divers, and, hyperbaric atmosphere control, to name just a few." CAPT Flynn's contributions to diving research have been significant and will continue to have a major influence on Navy diving well into the future.

CAPT Flynn assumed command of NMRDC in June 1991, during a period that was characterized by tri-service reorganizations, research and development budget cuts, and sharp reductions in military end-strength.

RADM Scott pointed out CAPT Flynn's efforts during this time, " He transformed NMRDC from a collection of independent laboratories, each on its own course, into a corporate system having a focused sense of purpose and a more efficient organizational management structure. He was the guiding force in the development of the Navy medical R&D strategic plan moving NMRDC into the 21st century. The plan is designed to maintain the science base and applied research capabilities for rapid responses to operational and medical support requirements while eliminating all redundant infrastructure and associated excessive costs".

CAPT Flynn was involved in marketing Navy medical research and development efforts to the private sector. During his three years as Commanding Officer, he established the Navy lead in technology reinvestment, often referred to as technology transfer. Commercial partnerships were encouraged between NMRDC's researcher and their counterparts in the private sector to integrate Navy technological innovations into civilian use products, services and internal processes.

CAPT Flynn commented on life in the Navy, how others influenced his career, the importance of his family's support, and the challenging role as the commanding officer of NMRDC, "What joins us together is our love of the Navy, our love of science, and our love of Navy medicine and all that it stands for. Navy life is filled with interesting, unusual, and challenging experiences that later turn into fond

memories. Along the way you encounter people who mold your life and in the process become lifelong friends."

He added, "I've had the opportunity to examine the research enterprise from the bench level all the way to the halls of Congress. I've seen our research products become reality in the Fleet and save lives. I've had the chance to work with some of the finest people in the world. They are what makes the Navy great. They are what I will miss the most."

CAPT Jones left command of the Naval Health Research Institute, San Diego, CA, one of NMRDC 's laboratories, to assume command. As he spoke to those in attendance he focused on the future of Navy medical research and development and the challenges ahead, " We are not going to be doing 'more with less', rather, we are going to be doing our 'very best' with what we have."

CAPT Jones went on to say, "We don't navigate any R&D course with just programs and dollars, we do it with people. The most important asset we have at NMRDC is our people. And the people of NMRDC are committed to providing the best biomedical research support to the men and women of the Navy and Marine Corps."

During the change of command and retirement ceremony in front of the National Naval Medical Center Tower, former Navy CNO ADM Elmo R. Zumwalt Jr., board chairman of the Navy's C.W. Bill Young Marrow Donor Recruitment and Research Program, praised NMRDC's pioneering efforts in bone marrow transplantation research and the support of the National Marrow Donor Program. According to ADM Zumwalt, "Prior to the Navy's role in supporting the institution and growth of the National Marrow Donor program, the only realistic marrow donor for any patient seeking a marrow transplant was a brother or sister, and only 30% of these patients had a sibling who adequately match them. With Navy support the National Marrow Donor Program has over 1,200,000 volunteers and now 50% of patients seeking donors have the potential for a transplant from a matched donor from outside their own family, an unrelated donor."

ADM Zumwalt pointed out that NMRDC played a pivotal role in the development of the key technology for matching donors and patients by the direct analysis of the HLA genes using DNA methods, "Together with the National Marrow Donor Program, the Navy has provided the scientific and technical support to transition DNA based testing from the research laboratory to clinical reality". He went on to add, "Because of the Navy's research efforts the National Marrow Donor Program can offer the hope of cure to thousands of Americans with otherwise fatal diseases and to provide contingency support in the event of national disaster or military conflict where marrow toxic materials are involved."

ADM Zumwalt also praised other NMRDC accomplishments such as the Joint Forward Laboratory in Somalia that was part of the Joint Medical Task Force. This laboratory rapidly diagnosed infectious diseases that occurred in deployed forces allowing the preventive medicine practitioners to put measures in place to prevent epidemics.

He also mentioned research concerning frozen and freeze-dried blood products and universal donor blood for military emergencies, studies of the molecular and cellular mechanisms regulating inflammation, night vision training aids, a

prototype electronic battlefield medical data collection device, and vaccine development efforts focusing on campylobacter, cholera, and malaria. Just a few accomplishments by NMRDC.

## U.S. Naval Medical Research Unit No. 2 Detachment Closed In June 1994

The Manila detachment of NAMRU-2 closed June 1994 after 15 years in the Philippines. Closure of the Manila detachment was made necessary by the loss of 14 officer and 18 enlisted billets from NMRDC's FY94 authorized end-strength.

Although officially established in Manila on 15 April 1979 when it relocated from Taipei, Taiwan, NAMRU-2 had long been active in research collaborations in the Philippines. NAMRU-2's earliest work in the Philippines was an investigation of a reported increase in Entamoeba histolytica infections at Naval Air Station Cubi Point in 1959.

In September 1961, an epidemic of cholera in Manila brought NAMRU-2 back to the Philippines to begin what would become a long and fruitful association with the Philippine Department of Health and the staff of San Lazaro Hospital in Manila. Working with their Filipino colleagues, NAMRU-2 scientists modified and improved upon the Navy-developed method of treating cholera by accurate assessment of lost body fluids and replacement with appropriate intravenous fluids. As a result, the case fatality rate from cholera fell from 40% to 2% within a week of implementing this method. Later, the oral treatment of cholera, developed in Bangladesh by a former NAMRU-2 commanding officer, received its first evaluation by NAMRU-2 investigators at San Lazaro Hospital and soon came into widespread use throughout the Philippines and the developing world.

In 1966, NAMRU-2's investigation of an epidemic of dengue hemorrhagic fever in the Manila area elucidated the pathophysiology of the disease. Again in 1967, NAMRU-2 assisted the Philippine Department of Health in the investigation of a new "mystery disease" in Northern Luzon which affected several hundred people, many of whom died. During three years of continuous work, NAMRU-2 epidemiologists and parasitologists identified the new parasite as Capillaria philippinensis, demonstrated the unique life cycle, determined the mode of transmission and evaluated drugs for treatment.

From 1968 until officially relocating to the Philippines in 1979, NAMRU-2 maintained a laboratory at the San Lazaro Hospital. During these years, numerous projects were conducted in the Philippines, including surveillance for scrub typhus, dengue fever, influenza, amebiasis, leptospirosis and schistosomiasis, as well as studies on the etiology of encephalitis, jaundice, meningitis and diarrhea. Biomedical surveys also were conducted throughout the Philippines to establish baseline data on a wide variety of parasitic, bacterial and viral diseases and vectors.

In April 1979, NAMRU-2 was provided additional laboratory space at San Lazaro Hospital and the Bureau of Research and Laboratories in Manila, and the command and administrative offices were relocated in Makati. In May 1987, renovation of the present spaces in Pavilion 7 were completed, consolidating the command and administrative offices in the San Lazaro compound where they would be close to the research staff. During the 1980s, other buildings were built or renovated to provide laboratory space and research support including a

medical library, oral rehydration facility, entomology building, animal house and garage/warehouse. A satellite laboratory was built in Palawan to study malaria and laboratory spaces at the Angeles City and Olongapo Social Hygiene Clinics were renovated for use in HIV surveillance.

Throughout the 1980s, research grew apace with the growth in facilities. Previous research initiatives such as intestinal capillariasis, schistosomiasis, leptospirosis and others continued while new research interests emerged. Malaria, particularly the clinical presentation, immunology, drug sensitivity and cultivation of Plasmodium falciparum, became a major area of research. Important work was done on the epidemiology and clinical manifestations of dengue fever, chikungunya and Japanese encephalitis in both indigenous Filipinos and U.S. personnel stationed in the Philippines. The vectors of these arboviruses, as well as the vectors of malaria in the Philippines, were the subject of extensive research, often in collaboration with the U.S. bases at Clark and Subic Bay. Other work performed during this period included studies of filariasis, diarrheal agents, typhoid fever, acute hepatitis, sexually transmitted diseases, cobra bites and Ebola virus infection in Philippine monkeys.

In 1985 a longitudinal study of HIV seroincidence and a companion natural history study were begun in the cities adjacent to the U.S. bases and extended to include all regions of the Philippines. In mid-1989, serious threats from communist insurgent elements forced the relocation of U.S. personnel from the San Lazaro Hospital compound to a U.S. Embassy building in Makati. For their security, U.S. personnel could visit their laboratories sporadically. Consequently, the decision was made to relocate the command to Jakarta, Indonesia where a detachment had been in operation since 1970. By October 1990, the only remaining funded work unit in Manila was HIV infection in militarily-relevant geographic areas. On 15 March 1991, the command was officially established at Jakarta and the Manila laboratory was downgraded to a detachment. Since March 1991, work has continued on the epidemiology and natural history of HIV infection in the Philippines. Additional minor collaborative projects on Ebola virus infection in monkeys and on hepatitis were also undertaken.

In June 1993, NMRDC reluctantly decided to close the Manila detachment in order to preserve viable scientific programs at NAMRU-2 Jakarta. During the final year, the Manila detachment accelerated the pace of research to complete an epidemiological study of HIV in the metropolitan Manila area by April 1994.

**Final report on the disestablishment of NAMRU-2 detachment, Manila**

A. Civilian personnel Actions:

1. All actions were completed as projected in the 31 May update report.

2. A farewell party was given for all NAMRU-2 DET FSN and non-personal services (NPS) contract personnel. Letters of commendation and unit plaques were presented to those who had contributed to completion of research and closure actions during the final year. Embassy contracted guards, janitors and other NPS contract personnel with less than six months of service were given letters of appreciation.

B. Plant and Minor Property Equipment Disposition

1. The company contracted to ship equipment by seavan to NAMRU-2 Jakarta packed and crated all items between 16 - 23 June. The eight crates were then loaded into a 40-ft seavan which was scheduled to leave Manila by ship on 26 June.

2. The 35 items of equipment approved for transfer to the U.S. Department of Veterans Affairs (USDVA) Clinic, Manila were picked up on 13 and 23 June.

3. Leased photocopiers and the telefax machine were returned on 27 June.

C. Medical Library

1. All shipments of library materials to Jakarta were completed in May. A total of 438 boxes of library materials were shipped by MPPS mail at no cost to NAMRU-2 Jakarta during the closure.

2. Two personnel from San Lazaro Hospital completed training under our Medical Librarian. To open up more floor space and make the library shelves look less empty, 28 sets of shelves were moved to the garage and all books and journals reorganized on the remaining shelves by our librarian assisted by the two new librarians.

D. Files

1. Three boxes of 1993 and 1994 files were mailed to NAMRU-2 Jakarta on 24 June, completing the transfer of all detachment files.

E. Supplies

1. All shipments of excess supplies to NAMRU-2 Jakarta were completed in May. A total of 358 boxes of excess supplies were shipped during the closure.

F. Return of Vehicles

1. The 1991 Chevrolet van was turned in to the GSO Transportation Unit on 27 June for shipment to NAVSUPPFAC Deigo Garcia. The 1989 Toyota sedan was turned over directly to the Naval Criminal Investigative Service, Manila on 27 June.

G. Negotiations for future research collaboration

1. On 21 June, met with representatives from the Research Institute for Tropical Medicine (RITM), Bureau of Research and Laboratories (BRK) and San Lazaro Hospital to discuss possible future research collaborations with NAMRU-2 Jakarta in preparation for CAPT Wignall's visit. On 27 June, prior to the turnover ceremony, CAPT Wignall met with representatives from these organizations as well as the Field Epidemiology Training Program (FETP) and USAID.

2. The proposal for Title 10 funding for surveillance of multi-drug resistant tuberculosis in the Philippines was approved by the Country Team.

H. Completion of Research

1. **HIV seroprevalence and risk factor survey** A one-hour presentation on the preliminary findings of this study was given on 10 June as part of a symposium of AIDS prevention and control hosted by the Department of Health.

2. **Acute Hepatitis study** A total of 103 adult and 70 pediatric cases with matched controls were enrolled in this study. The last follow-up specimens from this study were shipped to NAMRU-2 Jakarta on 15 June for testing by LT Richards.

3. **Manuscript preparation** Data entry for these studies was completed and all data were backed up on 5.25 floppy disks and sent to NAMRU-2 Jakarta for further analysis by their biostatistician. With the help of this analysis, manuscripts will be drafted on these studies. In addition to the data disks, completed consent forms and questionnaires were also sent to NAMRU-2 Jakarta.

4. **Shipment of specimens** Despite continued shortages of dry ice, 22,520 specimens were shipped to NAMRU-2 Jakarta in 8 air-freight shipments during June. A total of 48,854 specimens were successfully shipped in 22 air-freight shipments to NAMRU-2 Jakarta during the closure.

I. Accounting Closeout

1. Letters of intent were developed and forwarded to electric utility, water and phone companies on 13 June indicating that San Lazaro Hospital would assume responsibility for payment after 27 June. This action will prevent interruptions in service and loss of phone lines that would otherwise occur.

2. Mr. Agus, NAMRU-2 Jakarta's budget analysis officer, was TAD to Manila from 12 - 17 June for closeout of accounts and finalization of plans to pay utility bills and other accounts that cannot be closed out prior to disestablishment. Ten boxes of accounting files were mailed to NAMRU-2 Jakarta on 23 June.

3. The U.S. Embassy was formally notified by letter of 21 June to forward all future invoices form obligations made prior to 27 June to NAMRU-2 for payment.

J. Facility turnover

1. All 419 items of excess equipment approved for HAP-E donation were formally turned over to the Philippine Department of Health (DOH) during the disestablishment ceremony on 27 June 1994. The DD-1149 effecting the donation, signed by Ambassador Megroponte and Secretary Flavier, was forwarded to NMRDC on 27 June. A detailed printout of all donated items, showing the location and condition of each item, was provided to DOH along with a copy of the DD-1149.

2. All 222 line items of excess supplies approved for HAP-E donation were turned over to DOH during the ceremony of 27 June along with a detailed listing of the donated items. Donated supplies were placed in boxes which were neatly stacked on shelves in the garage/warehouse. An inventory of contents was posted on the outside of each box.

3. All books and journals approved for HAP-EP donation were formally turned over to DOH during the ceremony of 27 June along with a detailed listing of all donated materials.

4. Designated representatives of San Lazaro Hospital and RITM (the organizations that will occupy the facilities) were shown around the facilities after the turnover ceremony and were provided keys, door combinations and safe combinations.

## The Naval Medical Research Institute Detachment Brooks Air Force Base

The Naval Medical Research Institute Detachment (NMRIDet Brooks) Brooks Air Force Base officially stood up 1 October 1994. CAPT Robert G. Walter, DC, USN, Commanding Officer of the Naval Medical Research Institute took command of the detachment at a commissioning ceremony 28 October 1994 at Brooks Air Force Base. On hand for the activities were CAPT Thomas N. Jones, MSC, USN, Commanding Officer of NMRDC; Brig Gen Robert Belihar, Commander of Human Systems Center; and COL Boyd Campbell, Commander, Army Medical Microwave Bioeffects Branch.

Established with existing assets from the Naval Aerospace Medical Research Laboratory in Pensacola, FL, NMRIDet Brooks is the culmination of efforts begun in 1991 as a result of the DoD Base Closure and Realignment Report (Project Reliance). This effort supports the collocation of the Army Medical Microwave Bioeffects Program, the Navy Electromagnetic Radiation Program and the Army and Navy Laser Bioeffects Programs.

The new detachment's primary mission is to conduct research, development, testing and evaluation of the biomedical effects of electromagnetic radiation to enhance the health, safety and readiness of Navy and Marine Corps personnel. Under the tri-service program the detachment will share information with the other services. With the collocated laboratories, the DoD can downsize and yet maintain a "critical mass" of researchers to collaborate on the collection of scientific and technical data.

Areas of research to be addressed by the detachment include providing service members and workers with a safe work environment, the performance and survival of armed forces in hostile environments, and the commitment of environmental responsibility to communities that house military installations.

## Navy/Army Dental Research Consolidation Moves Closer

Project Reliance/BRAC 91 mandated the collocation of Army and Navy dental research at Great Lakes, IL. After numerous delays and obstacles, collocation of the two dental research programs now has a firm timetable. Construction to rehabilitate spaces at the Naval Dental Research Institute (NDRI) is scheduled to begin in February 1995 with full occupancy by the Army in August 1996.

On 1 December 1993, a meeting was held at the Pentagon with Dr. Joseph Osterman; RADM Ronald Morse, Chief of the Navy Dental Corps; MG Thomas Tempel, Chief of the Army Dental Corps and Deputy Surgeon General (acting); CAPT Ralls, Commanding Officer, Naval Dental Research Institute; COL Michael Rethman, Commander of the U.S. Army Dental Research Detachment at the Walter Reed Army Institute of Research; CAPT Michael Parsons, NMRDC U.S.

Army Program Liaison; and other senior officers. Both Army and Navy representatives quickly agreed conceptually to a consolidated dental research program.

As requested by Dr. Osterman, a direct outcome of this meeting was a letter signed by MG R.T. Travis and RADM W.A. Buckendorf which initiated the first formal move toward consolidation and outlined necessary steps. One of the first steps was to schedule a ground-up rebuild of the Army and Navy dental research programs, similar to that done with the infectious disease program. The rebuild for dental research is planned for 19 April 1994. Various service representatives, scientists, dentists, NIH experts, and others will evaluate and grade dental research on different criteria. The rebuild will establish research priorities while shaping the direction of a consolidated laboratory.

The dental research programs of both services are comparatively small. In an environment of increasing demand for decreasing resources, it is imperative that efficiency be improved if the program is to survive. Consolidation of the two programs would comply with the law and preserve mission capabilities.

Among other benefits, consolidation would (1) streamline command and control; (2) reduce costs by sharing and leveraging resources; (3) preserve a world-class technology base; (4) provide more diversified services to customers; (5) improve inter-service cooperation and communication; (6) enhance the reliance of one service on another for technology development; (7) provide better return on investment through sharing and increased efficiency; and (8) provide a bi-service research environment which will promote recruitment, retention, and career progression of quality personnel.

**Dental Research Is Important To The Navy**

Dental problems significantly impair operational readiness and sustainability. Navy and Marine Corps personnel can find themselves in operational settings with no immediate access to dental care, let alone specialty care, and where dental problems could jeopardize a multi-million dollar mission.

Nearly one in five MEDEVACs in Vietnam was for dental reasons. In Desert Shield/Storm there were 18,885 dental patient visits, and 30% were for dental emergencies (5,678).

These military-unique situations require dental research to characterize patient populations, identify better diagnostic and risk assessment techniques and methods of prevention and treatment, improve the health care delivery system, and address short-fuse research-related issues.

The civilian sector has shown no interest in investigating problems such as dental emergencies in operational environments, Phased Dentistry (a unique management care system for Navy dentistry adopted by BUMED), dental sealants on recruits, third molar emergencies, risk assessment by corpsmen, systematic evaluation of disease progression prior to treatment, wellness, and quality of life.

Navy dental research is the best, by far the most responsive, and most cost-efficient way to conduct this important research. Navy dental research has historically been a highly productive area of biomedical research.

## NHRC Begins Three Studies Of Gulf War Veterans

At the direction of the Surgeon General of the Navy, the Naval Health Research Center (NHRC) in collaboration with the U.S. Army; the University of California, San Diego; the Department of Veterans Affairs, and other Navy commands, is launching three five-year studies to examine the evidence for Persian Gulf War-related illnesses.

These studies, designed to help define a Gulf War Veterans Syndrome, will target likely origins and associated risk factors. In addition, they may also lead to better diagnostic tools, and improved treatment and preventive cure measures for military personnel deployed in future conflicts.

The Navy's comprehensive approach toward understanding and explaining the diverse symptoms experienced by some of the more than 650,000 U.S. military personnel deployed to the Persian Gulf during the 1990-91 period began in November 1992 with initial data collected by a multidisciplinary team. This group of researchers, led by epidemiologists from the Navy Environmental and Preventive Medicine Unit No. 2 (NEPMU-2) conducted surveys of personnel of Reserve Naval Mobile Construction Battalion 24. Because attempts to determine the causes of Gulf War related illnesses have been inconclusive to date, additional medical research and clinical resources are being used to investigate this problem.

Researchers at NHRC have planned three extensive studies designed to determine if Gulf War veterans have a higher illness and mortality rate than nondeployed personnel. The military population (active duty and reserve) included in these studies will be followed for at least five years to detect possible latent manifestations of Gulf Ware-related illnesses.

Some of the causative agents NHRC researchers will consider include exposure to chemical and biological warfare weapons and exposure to war materials, industrial accidents, pollutants, vaccination(s), post-traumatic stress syndrome, and use of medications.

In the first of these three studies, NHRC investigators will follow up on NEPMU-2's initial study of Navy Construction Battalion personnel by interviewing, sampling blood, and distributing questionnaires to 2,250 SEABEES, 1,500 of whom are Gulf War veterans, to determine the prevalence of symptoms that may be related to Gulf War hazards or other stressors. Additional data collected will include potential environmental, clinical, occupational, geographical, temporal and demographic risk factors. The aim is to identify illnesses that may be more common in Gulf War veterans and to identify possible risk factors.

The second study will be a comparison of post-war hospitalizations among approximately 350,000 active duty military personnel who participated in the Gulf War and 700,000 similar military personnel who did not deploy to the Persian Gulf. This study is designed to determine if military personnel deployed during the Gulf War are as healthy as their counterparts who remained at home, by using military hospital records and early 1990 physical fitness test scores.

The populations identified in the second study will also be used in the third study, which will compare health factors of children born to Gulf War veterans to those of other active duty, non-Gulf Ware veterans. The goal will be to determine if differences exists between the two groups in terms of premature birth, birth defects and prenatal death.

## NMRDC's Women's Health Research Program

The changing demographic character of the military with the increasing proportion of women in non-traditional ratings and assignment to combat roles raises questions concerning the impact of such jobs on women's health, the mechanisms employed by women to cope with new occupational demands, and the requirements for Navy medicine to provide care to women engaged in the full spectrum of occupational sites and situations. NMRDC is actively involved in research concerning database development, health surveillance, epidemiologic studies, and studies of specific health issues related to military service

### Women Aboard Navy Ships: A Comprehensive Health And Readiness Project

This is the cornerstone project of the Navy's efforts to assess the needs and availability of health care for military women. This study is a comprehensive, integrated health assessment of women aboard ship focusing on (1) shipboard occurrence of illnesses and injuries, (2) subject-reported conditions, diseases, injuries, and exposure to occupational hazards, (3) health care utilization, (4) health promotion services and lifestyle factors, (5) risk factors for reproductive health problems (6) interviews with shipboard health care providers, and (7) the development of an integrated, relational database. All research questions and questionnaires will be developed in coordination with appropriate personnel at BUMED and BUPERS, CINCLANTFLT and CINCPACFLT Fleet Surgeons and Force Medical Officers. Initially, 1,000 women aboard ship and matched comparison groups of 1,000 women ashore and 1,000 men aboard ship will be selected for detailed study. The techniques and instruments developed from the initial study will be expanded to cover all women assigned to ships and other deployed women. The data collected will assist BUMED and fleet decision-makers in several ways. The data will help define the personnel, resources, and training required to meet the medical needs of women aboard Navy ships. The results of this study will help to advance the operational objective of maintaining maximal readiness of the entire crew.

### The Health Status of Women in the Military: An Epidemiological Study of Active Duty Navy and Marine Corps Personnel

The purpose of this study is to conduct a large-scale military self-report health questionnaire that includes cardiovascular (blood pressure, heart rate) and physical measurements (height, weight, skinfolds) of Navy and Marine Corps active duty women. The results of this study (designed for tri-service utilization) will transition to the operational forces and provide information on women's health problems, risk factors and health care needs and practices in the following general areas: reproductive, medical/nutritional, psychosocial, lifestyle, occupational/environmental, and health services. Results will also be used to identify appropriate populations for subsequent studies needed to address specific health issues.

### Hospitalization Rates for Military Women: Feasibility and Design of a Tri-Service Relational Database Architecture Allowing Service-Specific and Tri-Service Reporting

This project will determine the feasibility of and specifications for a common Navy, Marine Corps, Air Force, and Army relational database architecture and interface to allow service-specific and tri-service reporting of hospitalization rates of disease and injury in women serving in the military. Hospitalization rates will be determined according to occupation, paygrade, duty station assignment, and other military-relevant variables and it will allow comparative studies by gender, branch of service, and national hospitalization rates. The tri-service relational database architecture will build on the data architecture developed and currently in use by the Navy. This architecture will be designed to support sharing of data in a timely manner, while maintaining service-specific, geographically separated databases, controlled by each service.

### The Epidemiology of Illness, Injury and Attrition Among Select U.S. Military Training Female Populations

The goal of this study is to collect real-time data regarding illness and injury in military women during training. Researchers will use a computer-based tracking system to establish rates and risk factors in subject training populations. The software features a user-friendly menu-driven format, electronic mail, and specific ICD-9 codes for illnesses and injuries. Data will be collected at three training sites (Naval Training Center, Great Lakes, IL; MCRD Parris Island, SC; Officer Candidate School, Quantico, VA) focusing on female enlisted Marine recruits and officer candidates and all female Navy enlisted recruits. The information will quantify the impact of women's health issues on attrition, training costs, and operational readiness. Research results will target areas for preventive interventions and provide a mechanism to test the effectiveness of the interventions.

### Gender Differences in Emergency Shipboard Damage Control Task Performance: Human Factors Solutions

All personnel assigned aboard U.S. Navy ships must be fully capable of performing sustained emergency damage-control tasks. The approach of this study is to modify the demands of the tasks by either redesigning the equipment, modifying procedures, or using mechanical aids. Researchers will observe 100 active duty men and women performing a set of representative emergency shipboard damage-control tasks, analyze and modify the tasks to reduce the physical demands, measure physical and damage-control task performance, and compare performance before and after the ergonomic intervention. Products resulting from this research will optimize shipboard operational readiness, safety, and worker productivity.

### Performance-based Occupational Strength Testing for Candidate Navy Pilots/Naval Flight Officers

Successful operation of an aircraft is critical to completing mission requirements as well as to the safety of aircrew and equipment. In this study researchers will identify appropriate strength requirements needed to safely perform duties in all

naval aircraft (by type and mission) that will be in the inventory beyond the year 2000. Performance requirements will incorporate instantaneous strength; sustained strength; and endurance for routine, emergency and survival situations (e.g., high G maneuvers, manual landing gear extension, ejection seat actuation, manual opening and closing of hatches and canopies). Once requirements are identified, occupational performance tests and strength test batteries will be developed, validated and established as strength performance standards. When this study is completed, a screening device and physical training program will be delivered to the Commanding Officer, Naval Aviation Schools Command, and an Occupational Standards Strength Test Battery will be delivered to Chief, Naval Education and Training.

### Countermeasures to Heat Stress in Females

High-heat environments impair work performance and can compromise combat mission success. To decrease the incidence of heat stress and increase performance capability, microcooling countermeasures have been developed for personnel working in encapsulated garments (i.e., chemical, biological, radiological ensembles and firefighting ensembles). This study will generate a new database regarding gender differences pertaining to these countermeasures by determining the effectiveness of existing microclimate cooling systems (MCS) (a whole-body water-cooled system, a vest air-cooled system, and a vest phase-change material system). This data will serve as a basis for development or modification of a MCS to be used in a mixed-gender population. Results of this project will be reported to Office of Naval Research, Bureau of Medicine and Surgery, and to DoD Warfare platforms.

### The Impact of Health Care Perception on Women's Health

Women's health care perceptions and the perceptions of their health care providers may affect women's health. To determine the impact of perceptions on women's health, variables related to their health, health care facilities, interactions with health care provider (physicians, physician's assistants, and independent duty corpsmen), and patient satisfaction during visits to health care facilities aboard ships will be evaluated. Women's subjective perceptions will be combined with their medical histories and the health care provider's perceptions and assessments to create recommendations for enhanced health care delivery.

### Assessment and Intervention for the Reduction of Adverse Gynecologic and Obstetric Clinical Events in Women Aboard Ship

Reproductive health problems, sexually transmitted diseases (STD), or unplanned pregnancies among active duty women aboard ship adversely impact combat readiness. Women who are identified as pregnant while on a prolonged deployment such as a Western Pacific deployment, must be evacuated to CONUS. This results in personnel loss, reassignment and costly evacuations. Using a multidisciplinary approach, researchers will define the demographic, biophysical, social, behavioral, health and situational concerns leading to reproductive health problems, STD, or unplanned pregnancies. Surveys will be conducted with focus groups in the target population, with key medical personnel, and with ship-based line personnel. The data from this study will establish the

groundwork for the development of effective prevention strategies such as slide presentations, interactive educational games, group discussions and videos.

### Neck and Back Strain Profiles of Rotary-Wing Female Pilots

The number of women entering naval aviation is at an all-time high and a majority will be assigned to helicopter squadrons. With the increasing number of female pilots participating in rotary-wing operations there is a need to study how female pilots respond to the stressful helicopter environment. Researchers will develop a database of normal neck and back fatigue profiles of women focusing on the effects of cockpit ergonomics, helmet design, peripherals on the helmet, vibration and fatigue leading to soft tissue injury. The database will assist in the formulation of methodologies to minimize neck and back strain that may lead to long-term soft tissue injuries in female rotary-wing pilots.

### Use of Noninvasive Bone Structural Measurements to Evaluate Stress Fractures Among Female Recruits in USMC Basic Training

Military personnel subject to physical fitness standards are prone to suffer musculoskeletal overuse injuries. These problems are amplified in recruit and training populations when strenuous activity is dramatically increased. These injuries often result in lost training time, failure to complete training, increased training costs, and decreased operational readiness. This study will develop predictive models of stress fractures and other overuse injuries seen in female military trainees at MCRD Parris Island, SC by using noninvasive measurements of bone structure using a commercial bone mineral scanning system. Scanning data are to be coordinated with epidemiological data to plan preventative strategies for overuse injuries among Navy and Marine Corps personnel. This will allow military training staffs to develop training regimens that attain the desired operational readiness with a minimum impact from these problems.

## Scientific Team Launches Military-Based Intervention For STD/HIV Prevention

Prevention has become a major thrust in AIDS research as it is increasingly evident an HIV vaccine or curative chemotherapy will not be imminently available. Further, this fatal illness is completely preventable through changes in individual risk behaviors. However, the prevention effort is hindered by a lack of information on effective methodologies and educational programs to change what are often well-established risk behaviors. The Navy medical community has formed a multidisciplinary team to develop and test military specific behavioral interventions for the prevention of HIV and other sexually transmitted diseases (STDs). In addition, a cornerstone of the approach is to validate noninvasive diagnostic testing for STDs for improved screening and treatment.

This team consists of medical researchers at the Naval Health Research Center, San Diego, CA; the Naval Medical Research Unit 2, Jakarta, Indonesia; the Naval Environmental and Preventive Medicine Unit #5 (NEPMU-5), San Diego, CA; and NEPMU-6, Pearl Harbor, HI; the Consolidated Preventive Medicine Unit, Okinawa, Japan; and the University of California, San Francisco (UCSF). The program is funded by both the Naval Medical Research and Development Command and the National Institutes of Health. This dual-funding line reflects the applicability of this research to the civilian community.

The first platform selected was military personnel involved with Western Pacific deployment because of the increasing prevalence of HIV infection in some of the foreign ports and the potential impact of STDs on operational readiness. The study design includes an experimental group receiving the STD behavioral intervention training and a comparison group receiving basic life support (BLS) training, with approximately 800 male Marines enrolled. Study activities involve early-deployment baseline STD screening and a questionnaire, STD intervention training (or BLS), and late-deployment STD screening and a questionnaire. The effectiveness of the STD intervention training will be evaluated both biologically (acquisition of STD infections) and through analysis of the self-report questionnaire data of STD knowledge, attitudes, and behaviors.

The behavioral intervention program is 8 - 10 hours of interactive education delivered by preventive medicine technicians (PMT). It was developed by UCSF researchers in collaboration with Navy investigators, particularly from the preventive medicine community, and line Marines. It is different from standards STD education programs in that it is Marine-specific and emphasizes skill-building.

The program components are "multimedia" with didactic slide sessions, educational games, skills-building exercises, role-playing, and videos. The first video depicts Marines on liberty during a Western Pacific deployment and the consequences of behavior. The second video, a dialogue with three HIV-infected active duty personnel (two men and one woman), powerfully portrays the impact of being HIV-infected. Key elements of the intervention includes STD knowledge, perceived susceptibility, peer influence, use of alcohol, and safer sex practices.

Initial intervention training has been successfully completed, demonstrating this to be a feasible approach. Verbal and written feedback from Marine participants and PMT instructors have enthusiastically endorsed the behavioral intervention program.

A major biologic research component of this program is to evaluate a new molecular technology capable of diagnosing two common STDs (chlamydia and gonorrhea) on a urine specimen. Urethral swabs, which are uncomfortable, are one of the barriers to STD detection, treatment, and counseling. Validation of this technology would provide a rapid, painless, and more acceptable alternative for STD diagnostics for active-duty personnel.

Future efforts for this research include the application of these strategies to shore-based military personnel. Future efforts for active-duty women will included designing and implementing effective programs for the prevention of not only STDs but also unplanned pregnancies. The ultimate outcome is to educate military personnel and to teach them how to defend themselves and their families against life-threatening illness and disease.

## NMRDC And Technology Transfer

The primary mission of NMRDC is to provide timely solutions to Navy and Marine Corps medical and operational problems through biomedical research, development, test, and evaluation. NMRDC's research areas concentrate on combat casualty care, infectious diseases, diving and submarine medicine, environmental and occupational health, aviation medicine and human performance, military oral health, and bone marrow research.

These seven research areas focus on operational medicine, which is occupational medicine practiced in a military environment. Operational medicine is very different from traditional medical care provided at military and civilian hospitals and clinics. Operational medicine specifically addresses the physical readiness, performance, and safety issues of military recruits, special training groups, and personnel in the surface, submarine, air, and amphibious warfare communities.

NMRDC includes a system of strategically located basic-science and technology-based laboratories in the U.S. and overseas. At these laboratories Navy and civilian scientists conduct basic, clinical, and field research. These in-house research efforts are complemented by a contract and grant program with universities and private industry. NMRDC also supports research in other Navy laboratories as well as in partnership with the Army and Air Force and other Federal agencies.

While NMRDC's mission remains the same, the command has expanded in a new supplementary direction of technology reinvestment, often called technology transfer, that benefits the Navy and the country's economy. New commercial partnerships are forming between NMRDC's researchers and their counterparts in the private sector to integrate Navy technological innovations into civilian-use products, services and internal processes.

To derive maximum return on research dollars, Congress passed legislation in the 1980s allowing the transfer of federally funded technology to the civilian sector. The Stevenson-Wydler Technology Innovation Act in 1980 and the Federal Technology Transfer Act in 1986 opened the doors for strategic alliances between federal laboratories and universities, non-government laboratories, and industry.

This compilation of laws authorized Federal laboratories to enter into Cooperative Research and Development Agreements (CRADAs). Federal research assets (other than money) that have application to the civilian community (dual-use) are shared with non-government laboratories and industry through CRADAs. These laws are the only statutes that permit Federal laboratories to provide a private partner with protected proprietary information, intellectual property rights and exclusive marketing rights in advance of final research results.

NMRDC has made significant progress in the area of technology transfer through CRADAs. Since 1990 NMRDC's technology transfer efforts have increased and currently there are 40 active CRADAs.

NMRDC's first CRADA was signed by the Commanding Officer on July 24, 1990. The agreement transferred a cell line developed by Dr. Donna G. Sieckmann of the Naval Medical Research Institute (NMRI), Bethesda, MD, to Pharmingen for commercial development. The cell line, named DS-1, produces monoclonal antibodies against mouse $IgM^a$, producing a key reagent for immunoglobulin test kits. Pharmingen, a California-based corporation, provides biological test materials and monoclonal antibody tests to the public. In return for the use of the DS-1 cell line, Pharmingen pays NMRI a fee based on sales of monoclonal antibody test kits.

In March 1994, an NMRDC Technology Transfer Advisory Board and Working Group was formed to work closely with the in-house laboratories to consolidate, promote and market technology transfer efforts through an outreach program to industry. As a way to continue developing interactions between private industry and NMRDC, members of the advisory board have teamed with the Stennis Space Center, NASA, Marshall Flight Center, the Gulf Coast Alliance for Technology Transfer and Martin Marietta Manned Space Systems to provide seminars at various corporations throughout the country.

In addition, NMRDC involvement with the Office of Naval Research's Industrial Programs Divisions (IPD) resulted in a $50 thousand grant to NMRDC to support new initiatives in marketing NMRDC technologies.

Other, more traditional technology transfer efforts include networking through attendance at professional meetings, presentations, publications, external scientific peer review, use of contractor technical personnel at NMRDC laboratories, Small Business Innovation Research (SBIR) programs, and contracts and grants to the civilian sector. NMRDC's activities in these areas include more than eight million dollars annually in civilian sector extramural contracts and grants, and more than half a million dollars in SBIR.

CRADAs and establishment of intellectual property remain the core of NMRDC's technology transfer efforts. In the future NMRDC will implement Navy policies for technology transfer in ways that are innovative and adapted to Navy medical research and development and support the mission of this command.

## Five New Proposals Selected For The FY95 Independent Research Program

NMRDC's Independent Research (IR) added five new IR work units in FY95. These studies were chosen from a group of 25 proposals submitted last January and externally reviewed by approximately 45 technical experts from universities, industry and other Federal organizations.

The IR program's main goal is to keep Navy in-house investigators energized, enthusiastic, and competent in basic research by providing support for their high-interest, "edge-of-the-envelope" ideas. The focus on Navy staff investigators is why contract employees (Geo-Centers Inc., IPAs, etc.) can no longer be principal investigators on IRs. It is also why Infectious Disease (ID) investigators can participate in the IR program, even though Army has the lead for the core ID research, and why "transferring" leadership of IRs to non-federal employee investigators is normally unacceptable.

Even though IRs should be high risk studies, the Office of Naval Research expects productivity, demonstrated mainly in the form of peer-reviewed publications. IR investigators should feel an urgency to publish and to keep NMRDC informed of all publications "in progress".

IRs should reflect novel, creative principal investigator-driven ideas. IR proposals should not represent a group effort to bring more money into a project area. A comparison of an IR and related core work should demonstrate that the IR is a distinct effort with a unique expected product, not a reiteration or simple extension of work in progress.

## NMRDC FY95 IR PROGRAM

The FY95 IR program will consist of 13 work units, with median funding of $103K. Total program funding in FY95 is $1260K.

### New FY95 IR Work Units (first year):

Mechanisms of Free Radical Production in the Brain from Hyperbaric Oxygen Exposure

**Goal:** To determine the source(s) and effect(s) of oxygen free radicals in the brain which are believed to be central to the development of oxygen-induced seizures.

Mimicking of Conformational Peptides by Phage-Displayed Peptides

**Goal:** To investigate a novel approach to creating synthetic vaccines, combining mimicking folded conformational epitopes with phage displayed library technology and solid phase peptide synthesis.

Genetic Analysis of Dengue Viral Replication

**Goal:** To determine the proteins involved in the replication of the dengue viral genome and to analyze the structure-function relationship for these proteins.

Development of a DNA Vaccine Based Method for Identification and Assessment of Unique Targets of Protective Immune Responses

**Goal:** To use the emerging "Naked DNA vaccine" technology to identify targets of protective immune responses in Plasmodium yoelii and Plasmodium falciparum.

Use of a Dominant Negative Construct of the IP3 Receptor to Investigate the Importance of IP3 in Signal Transduction **In Vitro and In Vivo**

**Goal:** To determine the role of the inositol-triphosphate receptor in T cell activation and signal transduction, clarifying the mechanism(s) of this critical mediator of $Ca^{2+}$ metabolism.

### Continuing FY95 IR Work Units (second year)

Antimicrobial Activities of Polymorphonuclear Neutrophil Granule Components in Human Periodontal Disease

Characterization of the Role of Costimulatory Molecules in Organ Transplantation and in Septicemia

Culturing Plasmodium sp. Sporozoites **In Vitro**

Validation of a Computer-based Psychomotor Test (CBPT) for the Selection of Female Naval Aviators

Effects of Avermectins (Mectizan®) on Acquisition and Transmission of Specific Arthropod-Borne Rickettsial, Spirochetal, and Arboviral Pathogens

**Continuing FY95 IR Work Units (third year)**

The Role of Cytokines in Recovery from Enteric Compromise Following Hemorrhagic Shock"

Evaluation of the Influence of Superantigens and Polyclonal B-Cell Activators in Periodontal Disease

Immunity to Malaria Infection and T Cell Reactivity to the Circumsporozoite Protein

## NMRDC's Basic Research Competitions Tag Three Winners For FY95 And FY96 Funding

NMRDC recently completed the second round of two competitions to select new, high quality studies for our basic research (6.1 Navy) program. These competitions were to select the FY95 Base Enhancement (BE) and the FY96 Accelerated Research Initiative (ARI).

**Base Enhancement**

The five contending BE proposals were externally reviewed for technical merit during February and March 1994. The reviewers' feedback showed that each proposal would be a worthy investment, yet their consistently high scores and comments strongly supported the proposal entitled "Simultaneous and Successive Color Contrast: Investigations of the Red-Green and Blue-Yellow Systems and Refinement of the Opponent Model," by Dr. Kevin Laxar, Naval Submarine Medical Research Laboratory (NSMRL). This winning proposal was thought to be "strong on innovation" with a high likelihood of advancing our understanding of basic mechanisms of color vision. This knowledge has important potential application in the design of visual information displays used in Navy operations. Dr. Laxar will begin this work in FY95 and will be supported in the 6.1 Navy base program until the research is ready to transition.

**Accelerated Research Initiative**

On March 5, 1994, a panel of external experts met to receive briefings on the competing FY96 ARI proposals, to discuss the pros and cons of each candidate, and to recommend an optimal investment strategy.

The ARI panel members were Steven Zornetzer, Ph.D., Office of Naval Research (Chairman); Steven Colburn, Ph.D., Boston University; Robert Gilkey, Ph.D., Wright State University; Howard Bassen, Ph.D., Food and Drug Administration;

John Monahan, Ph.D., Food and Drug Administration; Charles Lowenstein, M.D., Johns Hopkins University; Paul Miller, Ph.D., Johns Hopkins University.

This was not an easy task. Each proposal had compelling strengths and the panel clearly struggled to reach consensus on which project would yield the

greatest value for the Navy. The panel members deserve sincere thanks for the energy they all invested into our selection process and for their commitment to making the best possible recommendations for our limited ARI funds.

The proposals selected through this evaluation process were: "Effects of Microwave Radiation on Cognitive Performance," by Dr. John D'Andrea, NAMRL; and "Enhancement of Cues Required for Creating Three-dimensional Sound Environments," by Dr. Thomas Buell, NSMRL. These proposals are now being revised to incorporate the panel members' critical recommendations and will be funded during FY96 -FY00, in the range of $350K - $400K each year. The selection of these efforts shows that, as in prior years, our external colleagues believe we should fund proposals that are not only technically excellent, but also important to the Navy and not sufficiently studied in the civilian sector.

Because of recent changes at the Office of Naval Research (the funding sponsor for 6.1N and other NMRDC programs), NMRDC's ARI competition is likely to be redesigned for future years (the name "ARI" and some program constraints may disappear).

We expect the funding opportunity for new research to remain, however, and definitely will continue the emphasis on competition, to ensure that scientific excellence is a primary criterion for funding work in our basic research program.

## NMRDC Researcher Wins Another ATD In Navy's FY95 Competition

The Assistant Secretary of the Navy (Research, Development, and Acquisition) announced the selection of 14 Advanced Technology Demonstration (ATD) projects that will receive funding beginning in FY95. Among the winners was "Tactile Interface to Improve Situational Awareness," by CDR Angus Rupert, MC, USN, Naval Aerospace Medical Research Laboratory. CDR Rupert's ATD proposed a new approach for easing the problems of spatial disorientation (SD) in the aviation environment. SD occurs when pilots incorrectly perceive the attitude, altitude, or motion of their aircraft relative to the earth -- it causes pilots literally to drive their planes into the ground costing DoD more than $300M annually in lost aircraft and an immeasurable price in lost lives. With more frequent night operations using night vision goggles, all weather and low level flying, and improved agility aircraft, the SD problem will undoubtedly escalate.

The ATD will attempt to demonstrate that spatial orientation can be continuously maintained by providing information from the aircraft attitude sensor to the plot through the sense of touch. One can envision a torso harness fitted with multiple electromechanical tactors that continuously update the pilot's awareness of position (this is basically how our brains obtain orientation information in the terrestrial environment).

Such a tactile interface device would be applicable in Naval aircraft and SEAL delivery vehicles, might facilitate target location by sonar and radar operators, and would enhance pilot training in flight simulators. The device could reduce the time

pilots currently spend referring to aircraft instruments, increase aviator safety, and support greater mission effectiveness. This ASTD will be funded during FY95 - FY97 and will receive $13.3M total.

## Naval Medical Research Investigators Win Prestigious Weinstein Award

CAPT Edward C. Oldfield III, MC, USN, Naval Medical Center, San Diego, CA; General R. Rodier, MD, DTM, Naval Medical Research Unit NO. 3, Cairo, Egypt; and CDR Gregory C. Gray, MC, USN, Naval Health Research Center, San Diego, CA; were jointly awarded the prestigious Louis Weinstein award. The annual award is given for the best clinical article published in Clinical Infectious Diseases (CID), the clinical journal of the Infectious Diseases Society of America. This award is selected through a rigorous peer-review process by the Editorial Board of CID. The award-winning paper, "The Endemic Infectious Diseases of Somalia", focused on the communicable diseases common to Somalia. The article noted the importance of the development of sophisticated diagnostic laboratories in the Somali region. These facilities; staffed by Army and Navy medical personnel, are key to disease identification, control, and prevention. Written to coincide with the United Nations relief effort, Operation Restore Hope, the article provided much-needed information on conditions in the area. With nearly 26,000 troops deployed, Operation Restore Hope is considered the largest military humanitarian relief effort conducted in recent history.

## NAMRU-3 Responds To Rift Valley Fever Epidemic

An epidemic of Rift Valley Fever occurred throughout Egypt, causing significant morbidity among humans and livestock. NAMRU-3 responded immediately to the outbreak by sending a field epidemiology team to the endemic area. The NAMRU-3 team, consisting of epidemiologists, virologists, entomologists, veterinarians and skilled technical support personnel, as well as staff from NEPMU-7, Naples; USAMRIID, Ft. Detrick, MD; and Ain Sham University, Cairo worked in close cooperation with their Egyptian Ministry of Health and Ministry of Agriculture counterparts to assess rapidly the magnitude of the threat and make control recommendations. NAMRU-3 made the first RVF viral isolations from animal and human tissues and examined a range of potential arthropod vectors to determine the mode of disease transmission. NAMRU-3 continued to monitor the outbreak to prevent a repeat of the explosive 1987 RVF epidemic in Egypt that resulted in over 600 human fatalities. NAMRU-3 has expanded the scope of this operation by calling in collaborators from the World health Organization; the Centers for Disease Control, Atlanta; and the National Institutes of Health.

## Cholera Epidemic In Djibouti

NAMRU-3 was requested by the World Health Organization and the Ministry of Health of Djibouti to assist with a cholera epidemic in that country. Djibouti had over 3000 cholera cases, 50 fatal. A NAMRU-3 team with support from the Naval Medical Research Institute, Bethesda, MD, went to Djibouti to assess the situation and collect and analyze human samples. This team established that 32% of the diarrheal cases seen at cholera treatment centers in Djibouti were the result of infection of Vibrio cholera, serogroup Ogawa, biotype El Tor. For their threat assessment, control recommendations and laboratory analysis, the NAMRU-3 team was commended by the Djibouti Minister of Health.

## West Kalimantan Indonesia - A Major Focus Of Hepatitis E Identified By NAMRU-2

The epidemic nature of hepatitis E (HEV) is a phenomenon well recognized throughout Asia. First identified in India during the 1956 outbreak involving 29,000 cases, enteric related non-A, non-B hepatitis has since been detected in epidemic form from the neighboring countries of Nepal, Pakistan and Myanmar, as a single source water-borne agent with the potential to impact significant numbers of people at one time.

In Indonesia, HEV was the causative agent in an outbreak reported from West Kalimantan during October/November 1987. The virus was implicated as the responsible agent in approximately 2500 cases on the basis of 28 (out of 34) jaundiced patients who tested negative for both IgM anti-HAV and IgM anti-Hbc.

A follow-up investigation was carried out through a collaborative effort in September 1993 to describe the epidemiology of a 1991 outbreak and determine the persistence of IgG antibody response two years following the epidemic. Cases (79) identified from IgG HEV positives surveyed in 1991 were age/sex/community matched with controls (69) who had no reported history of jaundice and/or hepatitis. Preliminary findings indicate that West Kalimantan, Indonesia, is a likely focus for endemic HEV transmission. The high prevalence of HEV among study controls (61%) suggests many epidemic related infections to be inapparent in nature. Study results also provide the strongest evidence to date about the persistence of HEV IgG antibody response (2 years) resulting from an outbreak involving a significant proportion of the population.

## NMRI Scientists Disclose Promising Malaria Vaccine Results

Scientists from the Naval Medical Research Institute (NMRI), Bethesda, MD and a private biopharmaceutical firm disclosed the results of research that may lead to a new vaccine to combat malaria. The vaccine belongs to a new class of naked DNA vaccines that consist of highly purified strands of genetic material (DNA) that instruct cells to make antigenic proteins. The immunity generated by this approach can eliminate cells infected with the pathogen, in addition to destroying the pathogen itself. Naked DNA vaccines previously have been shown effective in animal models of influenza, herpes and rabies virus infections. This report is the first demonstration of the effective use of naked DNA immunization in a parasitic disease. The researchers reported that mice injected with the naked DNA vaccine encoding a protein from the malaria parasite induced high levels of specific antibodies and cytotoxic T lymphocytes. This immune response protected over 80 percent of the mice from subsequent challenge with a highly infectious dose of parasites.

## Initial Studies Completed Of Probable Hazard To Aviation: Push-Pull Effect

Researchers from the Naval Aerospace Medical Research Laboratory (NAMRL), Pensacola, FL released initial findings that clearly demonstrate significantly reduced positive G tolerance in some individuals immediately following zero or negative G acceleration stress (Push-Pull Effect). The study was made possible by the unique capability of the Coriolis Acceleration Platform (CAP) device used to combine angular and linear acceleration to human subjects. CAP is the only device in the DoD inventory available to study chronic exposure to altered G environments. Prior to this study using male and female USN volunteers, the importance and incidences of exposure to negative G acceleration stress in aviation had been discussed by aviation professionals including aerobatics and high performance pilots. Because operational situations exist that demand positive G and negative G light maneuvering of current military aircraft this

reduced tolerance could lead to a more rapid onset of G-induced loss of consciousness or other forms of incapacitation. Further operational research by NAMRL will be aimed at assessing the risks to aircrew, understanding the relevant physiology, and developing appropriate protective strategies. Educational efforts directed toward aviators and flight surgeons are underway within the Navy and Marine Corps aviation community aimed at increasing awareness of this potential hazard.

## Navy Medicine's Marrow Donor Program Supports Technological And Clinical Development With National Marrow Donor Program

Bone marrow transplantation is a method of treating bone marrow suppression caused by leukemia and other malignancies, radiation, or chemical injury. With experienced personnel and the appropriate facilities for bone marrow transplantation research, the Navy was tasked by Congress in 1990 to address tissue typing for patients without related donors and to develop an active Department of Defense recruitment program (The C.W. Bill Young Marrow Donor Recruitment and Research Program). Prior to the Navy's involvement in the National Marrow Donor Program (NMDP) the only realistic possibility for a marrow donor was being an HLA (tissue type) matched brother or sister and only 30 percent of patients have matched siblings. As part of this effort to save lives, sophisticated research laboratory based technology to define HLA type by directly analyzing HLA genes from each donor has been moved to clinical reality through Navy supported research. Over the past few years the precise nucleic acid sequence of many of the HLA types have been discovered. Recently polymerase chain reaction technology has been used to produce billions of copies of the short segment of DNA which codes the specific structure of that part of the chromosome dictating HLA type. The DNA for testing is obtained from a tiny sample of each donor's chromosomes, usually from blood cells but potentially from hair follicles or buccal scraping (inside mouth). Once the specific DNA is copied, it is tested with short pieces of specific nucleic acid unique for HLA types. Today over DoD 1,000 donors are typed each week by the Naval Medical Research Institute, Bethesda, MD and the NMDP civilian laboratories. And each week a DoD volunteer donor provides marrow for a potentially life saving transplant.

## Navy Researchers Develop Improved Hearing Protector Prototype For High Noise Environments

Hearing loss from exposure to hazardous noise is a major health problem in some military working environments. In 1992, the Veterans Administration reported 60,476 hearing loss compensation cases with associated compensation costs of more than $230 million. In addition, the Navy paid nearly $8 million in compensation in the same year for 2,560 civilian cases of hearing loss. To improve hearing conservation, researchers at the Naval Aerospace Medical Research Laboratory, Pensacola, FL are developing a new hearing protector. Unlike more expensive prototypes being developed by the other services that use electronics, this hearing protector is designed on the principle that sound pressure waves will not propagate through a vacuum. This Navy-designed hearing protector consists of ear cups with a vacuum space sandwiched between two layers of material. A major challenge in the development of this hearing protector prototype was designing a gasket that would not transfer sound energy to the wearer as vibrations. After testing many commercially available materials which proved unsatisfactory, Navy researchers formulated a special gasket material with excellent noise reduction capabilities. A patent has been filed on the material, and several private industries have expressed interest in licensing the

technology. In 1995, the goal of researchers is to incorporate a communications speaker in the hearing protector for use in operational environments; in many operational settings, double hearing protection (plugs and muffs) is required, which interferes with communication devices. If future testing of the prototype hearing protector confirms the expected noise reduction, the used of double hearing protection could be discontinued.

## Progress Toward Universal Donor Blood For Military Emergencies: Phase I Clinical Trials Using Enzymatically-Converted Red Blood Cells Near Completion

The Navy Medical Research and Development Command is currently supporting clinical trials of transfusion therapy using type B red blood cells enzymatically-converted to type O (universal donor) red blood cells. Converted red cells are used in the same way as native type O cells are used. The FDA approved Phase I clinical trials at the New York Blood Center and the General Clinical Research Center of the Rockefeller University Hospital are to assess immune response in volunteers and establish optimal treatment conditions for producing enzymatically converted red blood cells. Those trials are almost complete. Phase II testing has been approved by the FDA and is pending. Positive results from the research and clinical trial will not only provide a method to develop a continuous supply of type O red blood cells — cells that may be transfused to recipients of any blood type — but also will make greater use of existing supplies of blood types A and B, which are sometimes unused and discarded. Through the use of enzymatically-converted type O red blood cells, it will be possible to stock-pile by freeze preservation a single universal donor blood group for military emergencies. This would eliminate shortages of blood due to blood group incompatibility, eliminate the necessity for separate storage facilities for supplies of four different blood groups, and reduce the requirements for blood typing under operational conditions.

## The Behavioral And Performance Effects Of R-134a, A Non-Ozone Depleting Refrigerant, Is Being Evaluated For Ship And Submarine Use

In certain operational environments Sailors and Marines are at risk of exposure to environmental contaminants that may threaten their health and degrade operational performance. Currently, ozone depleting substances used as coolants and refrigerants are being replaced with R-134a (1,1,1,2-tetrafluoroethane) and other non-ozone depleting substances. Due to the unique environments aboard ships and submarines use of R-134a could create scenarios where personnel are exposed to undetectable, low concentrations for extended periods of time or to rapidly increasing concentrations in enclosed areas (R-134a is a clear and colorless gas with little odor or taste). Safety data provided by manufacturers does not provide non-lethal, acute toxicity information. Researcher at the Naval Medical Research Institute Toxicology Detachment at Wright-Patterson AFB, Ohio are developing tests to determine whether performance deficits, behavioral dysfunction and incapacitation without lethality can occur at low levels of concentration or after brief exposures. Additionally, using the tests, researchers will be able to evaluate the toxicity of not only R-134a but also any oxidative or pyrolysis product from combustion of the substance, another set of data generally not available from the manufacturer. The resulting data will be used to develop models predicting human exposure consequences in actual use situations, to tailor exposure limits during exposure conditions and to recommend medical surveillance and treatment guidelines.

## Noninvasive Monitoring Of Student Helicopter Pilots' Visual Instrument Scan Patterns

The ability of a pilot to visually scan and integrate information provided by flight instruments is one of the determinants of how well a helicopter is controlled. One important area of instruction for student pilots is the selection of which instrument to attend within a given flight context and how to coordinate the information available from several instruments. However, evaluation of the effectiveness of a pilot's instrument scan is generally limited to the successful performance of a given flight maneuver. Researchers from the Naval Aerospace Medical Research Laboratory, Pensacola, FL are working closely with helicopter pilot instructors at NAS Whiting Field to identify the major difficulties students face in acquiring an effective instrument scan. A noninvasive eye-tracking device has been installed in a motion-based helicopter simulator. This device provides an on-line, real-time video record of student instrument scanning patterns and flight performance. The video record will be used for debriefings, teaching, and flight grading standardization. This study is the first to gather flight performance data in conjunction with instrument scan data using a device that does not interfere with the behavior of the student. For the first time, an objective standard of operational performance will be applied to evaluate the effectiveness of instrument scan. This research is producing a unique scientific resource - eye tracker and simulator - that can be widely used by the scientific community to study instrument scan patterns and the acquisition of flying skills in motion-based simulators.

## Helicopter Instrument Scan Research At NAS Whiting Field Praised For Potential Operational Impact

CAPT R. O Abshier, Commander of Training Air Wing Five, recently praised the current helicopter instrument scan pattern research conducted by scientists at NAMRL. CAPT Abshier pointed out that the helicopter scan project has tremendous potential for making instrument scan pattern training of student naval aviators more efficient, effective, and safer. He added that the technology NAMRL is currently developing to study the training of instrument scan patterns in helicopter simulators (HT-57C) is equally applicable to fixed wing simulators (T-34). In fact, he noted it is in the fixed wing simulator that the scan pattern products may have their greatest impact since basic instrument scanning patterns are taught during this phase of all naval aviator training.

NAMRL's scientific staff has already determined that the scan pattern monitoring technology developed for the HT-57C simulator can be easily incorporated into the T-34 simulator. CAPT Abshier commended NAMRL for developing a research program that demonstrates an authentic responsiveness to the Fleet, for soliciting and incorporating Fleet participation and input for the design of products useful to the Fleet, and for generating an experimental program that uses field data to address practical issues in a rigorous, scientific fashion.

## MEDTAG - A Prototype Electronic Battlefield Combat Casualty Medical Data Collection Device

Researchers from the Naval Health Research Center, San Diego, CA developed the concept of an automated method of capturing battlefield medical data, which uses an electronic tag worn by combat personnel. This device, called MEDTAG, includes an integrated read/write capability, a backlighted LCD display to present users with menu options, two data entry buttons, an internal clock for time/date-stamping, and a data communications port for transferring information to and from a host computer. A field evaluation of the operational effectiveness of the MEDTAG prototype demonstrated the benefits of automated battlefield medical data collection. Navy corpsmen used MEDTAG while participating in battlefield and Battalion Aid Station field exercises during Fleet Marine Force training at the Field Medical Services School Camp Pendleton, CA. In the areas

of treatment, patient condition, and patient disposition, the MEDTAG device collected the required medical information faster, more accurately, and more completely than current manual methods. These features of the MEDTAG enable corpsmen to record the most critical data faster and with greater accuracy resulting in a higher level of battlefield casualty care.

## Liposome Encapsulated Hemoglobin: An Artificial Oxygen Carrying Fluid For Combat Casualty Care

The Navy has had a long-standing requirement for red blood cell storage and transfusion capability as part of resuscitation protocols aboard ships and at forward echelons of combat medical care. Fresh donated blood must be refrigerated, requires crossmatching to minimize the ever present risk of transfusion reactions, and can transmit diseases such as hepatitis, malaria, and AIDS. Liposome encapsulated hemoglobin (LEH), a promising blood substitute, is being developed by a team of Navy, academic, and industrial laboratories. LEH is hemoglobin (oxygen carrying protein) encased in microscopic lipid droplets with walls similar to cell membranes. Current efforts focus on demonstrations of LEH efficacy (oxygen delivery), safety (immune response and vasoactivity), and ability to manufacture the product on a large scale. LEH is formulated to be freeze-dried. Freeze-drying offers prolonged shelf life, reduced weight and volume, cost savings during storage and transport, and negligible processing prior to administration. The goal of this research effort is to generate the necessary scientific and manufacturing data required for application to the FDA for initiation of human trials by the turn of the century.

## Enterotoxigenic Escherichia Coli Vaccines

During Operation Desert Shield, 57% of personnel in ground units stationed in northeastern Saudi Arabia experienced more than one episode of diarrhea after three months deployment; 20% of those affected lost duty time. Enterotoxigenic Escherichia coli (ETEC) accounted for 30-60% of all diagnosed cases. Researchers in the Infectious Diseases Department, Naval Medical Research Institute (NMRI), Bethesda, MD are working with researchers at the NMRDC OCONUS laboratories in Egypt and Indonesia to develop the test sites needed to evaluate the efficacy of a first generation combination killed whole cell-toxoid vaccine (a mixture of E. coli colonization factor antigens and the B subunit of the cholera enterotoxin) to determine the suitability of this product for FDA licensure and general use within the fleet and FMF. It is anticipated that ETEC vaccine studies will begin in Egypt in FY95 and shipboard vaccine trials could tentatively begin in late FY95 or early FY96. In more basic ETEC studies, NMRI researchers have carried out pioneering research aimed at further defining the full range of virulence factors associated with the pathogenicity of ETEC. To date, two new enterotoxins and a new adherence factor have been identified. It is anticipated that this work will help to improve the protective efficacy of second generation ETEC vaccine candidates.

## Diagnostic Kit For BW Agents - A Simple Device For Rapid Field Identification Of Pathogens

Scientists in the Biological Defense Research Program at the Naval Medical Research Institute, Bethesda, MD, are successfully developing a field deployable system for the identification of Biological Warfare (BW) agents. This system utilizes hand held, flow through screening immunoassays, which take 15 minutes to perform and are similar to pregnancy tests, for identifying a range of infectious BW agents and toxins in clinical and environmental samples. This unique BW agent identification system will also utilize field deployed, laboratory based immunoassays and PCR assays linked to a sophisticated,

semiautomated, electrochemiluminescent biosensor for the confirmatory identification of BW agents in samples. Biosensor linked immunoassays can be performed in 15 minutes and are up to 1,000 times more sensitive than hand held screening assays. Biosensor linked PCR assays can be performed in the field in under 45 minutes. This approach utilizing far forward deployed hand held screening assays and laboratory based, rapid confirmatory assays for the identification of BW agents is the most comprehensive, specific and sensitive system yet developed.

## Campylobacter Vaccines

Enteropathogenic campylobacters, principally Campylobacter jejuni, are recognized as major diarrheal diseases pathogens worldwide. An estimated 400 million cases occur annually, with 2.5 million occurring in the United States. In U.S. military personnel, C. jejuni has been implicated as a cause of diarrhea in over 35% of the troops experiencing disease episodes during field maneuvers in Thailand, and in 10-20% of Navy and Marine Corps personnel with diarrhea after port-visits in Egypt and South America. Treatment and control of Campylobacter infections is becoming complicated because of an increase in multiple antibiotic resistance. Vaccination offers one of the best options for disease prevention in high risk U.S. forces. Researchers in the Infectious Diseases Department at the Naval Medical Research Institute, Bethesda, MD, developed two prototype oral vaccine candidates, a killed whole cell candidate and a live, attenuated candidate. The killed whole cell vaccine candidate has undergone the most extensive evaluation and was transitioned into advanced development by the U.S. Army Medical Materiel Development Activity in 1991. Further evaluation of this vaccine is being planned using human volunteers with the intent to license this product for DoD and civilian use. The first safety tests of the vaccine is scheduled for FY94 with field efficacy trials tentatively scheduled to being in FY 96/97.

## Researchers Study The Biomechanical Factors Of Overuse Injury During Naval Special Warfare (NAVSPECWAR) Training

NAVSPECWAR personnel are subject to physically demanding tasks during military training, exercises and operations which result in a high incidence of overuse injuries. These cause unnecessary morbidity, protracted recovery periods and decreased readiness. Researchers at the Naval Health Research Center, San Diego, CA are currently studying the biomechanical factors (i.e., ground reaction force patterns, quantification of shock wave transmission, foot pressure distribution, and bilateral motion analysis) related to the development of overuse injuries. Study results will be used to develop a model to predict specific overuse injuries. Also, the information will be used to develop screening programs, and prevention and rehabilitation strategies that will be implemented by medical care providers, the Military Entrance Processing Command and the training commands. The study was requested by the offices of the Commander, Naval Special Warfare Command; the Chief, Bureau of Personnel; and the Chief, Bureau of Medicine and Surgery.

## Entomological And Rift Valley Fever Surveillance Support To Operation BRIGHT STAR 94

Operation BRIGHT STAR is a biennial joint military exercise in Egypt involving U.S. and Egyptian forces. Troops perform maneuvers and cross-training exercises at remote sites under field and simulated combat conditions. As a result, troops are at increased risk of exposure to biting arthropods and arthropod-borne diseases (i.e., Rift Valley fever, West Nile fever, malaria, leishmaniasis and filariasis), as well as encounters with snakes, scorpions and spiders. The U.S. Naval Medical Research Unit No. 3 (NAMRU-3) in Cairo, Egypt historically assists in disease and vector surveillance support and as a reference resource to BRIGHT STAR operations. During the 1994 exercise NAMRU-3 field teams collected nearly 1,000 mosquitoes during 126 trap-nights. Culex pipiens was the most prevalent species collected, accounting for more than 87%, while Culex perexiguus and Aedes caspius, accounted for 3.6% and 7.9% respectively. Two potential malaria vectors, Anopheles pharoensis and Anopheles multicolor, accounted for 0.3% and 0.7%, respectively. Additionally, 490 U.S. troops were enrolled in an oral diagnostic protocol to assess their exposure to Rift Valley fever. Neither the virological screening of collected mosquitoes, nor salivary screening efforts resulted in detection of Rift Valley fever virus. Professional and technical support provided by NAMRU-3 during BRIGHT STAR 94 is yet another indicator of how extremely valuable military overseas research laboratories are in supporting deployed troops.

## MEDTAG Moves Forward In Development

Field corpsmen must document patient status and treatment at forward echelons of care to maintain continuity of care during combat and to facilitate follow-on care when the patient is evacuated. Field testing of MEDTAG, a prototype electronic battlefield medical data collection device, demonstrated its operational effectiveness during exercises at Fleet Marine Force Training, Field Medical Services School, Camp Pendleton, CA. Now, MEDTAG is being enhanced to interface with the Multi-Technology Automated Reader Card (MARC) being evaluated by OSDA(HA) for the Theater Medical Information System (TMIS). Using recent advances in electronic data storage technology, researchers at the Naval Health Research Center, San Diego, CA are evaluating and planning for several additional enhancements. These include the feasibility of providing expert decision support for personnel at the first and second echelons of care, automating the capture of physiologic information using voice-activated data entry, increasing the efficiency of the machine-user interface, and assessing equipment reliability.

## Tissue Bubble Detector For Navy Divers

Underwater diving operations require the management of diver time and depth profiles to minimize the risk of decompression illness (DCI), commonly known as the bends. DCI is caused by the development of air bubbles in the tissues of divers when decompression occurs too rapidly. Currently decompression techniques rely on precalculated time/depth tables or real-time computation from algorithms. However, the extremely complex physical and physiological issues relating to the etiology of DCI make predicting its onset difficult with current techniques. Under the Small Business Innovative Research program, the Naval Medical Research and Development Command has initiated a Phase II contract with Marisys, Inc. to develop a non-invasive tissue bubble detector. The detector should be capable of measuring the size and growth rate of a bubble population in living tissue. With near real-time data on tissue bubbles, scientists will be able to study and predict DCI. In turn, this knowledge could lead to better management

of DCI cases and perhaps one day, the development of a portable instrument that divers could use to safely monitor their decompression procedures.

## Development Of Hepatitis E Virus Vaccines (Epidemiology And Immunology Of Hepatitis E)

Hepatitis E Virus (HEV) has been identified as a major military disease threat. Although the epidemiology of HEV has yet to be fully described, HEV infection apparently mirror Hepatitis A Virus (HAV) infection relative to transmission determinants. Fecal/oral transmission via contaminated water sources seems the most likely mode of spread. Evidence from outbreaks in countries like Indonesia, where hundreds of people have been afflicted at the same time, highlights the importance of HEV as an infectious disease that has the potential to impact a large number of people (such as deployed military units) at a single time and from a single source. While a vaccine to prevent HAV infection is now available, currently, there is no vaccine or specific treatment for HEV. Researchers from the Naval Medical Research Unit No. 2 (NAMRU-2), Jakarta have recently completed a comprehensive two year follow-up investigation of an HEV outbreak in West Kalimantan, Indonesia. The research findings included: household clustering of anti-HEV positives; a significant increase in cross-sectional prevalence of anti-HEV positivity with increasing age; and a positive association with the use of river water for drinking/cooking, bathing, or human water disposal and serological evidence of infection. The results of the Kalimantan investigation suggest HEV endemicity with possible reservoir maintenance in human and/or animal populations. The area investigated may prove ideal in describing the natural history of HEV and as a future site for candidate vaccine trials.

## Tri-Service Toxicology: Three Distinguished Research Laboratories, One Center Of Toxicology Excellence

Tri-Service Toxicology is the functional integration of three previously separate military toxicology efforts. Under Project Reliance, the Naval Medical Research Institute Toxicology Detachment, the Occupational Health Branch of the US Army Biomedical Research and Development Laboratory, and the Toxicology Division of the Air Force Armstrong Laboratory were collocated at Wright-Patterson AFB. Their mission of Tri-Service Toxicology is to provide an integrated approach for innovative human health effects research to protect Department of Defense personnel, resources and the environment. Tri-Service Toxicology has many customers within the DoD, including material developers, operational commands, health and hygiene agencies, surgeons general, etc. Through the use and development of advanced methods, innovative toxicology research is conducted for operational, environmental and occupational arenas. Performance decrement test batteries, physiologically-based pharmacokinetc modeling, in vitro screens, and mechanistic studies, in addition to standard toxicity tests, are used to evaluate the potential hazards posed by new chemicals and material s in mission-relevant exposure situations. The vision of Tri-Service Toxicology is to cultivate a better partnership with material developers to improve weapons systems performance, control life cycle costs, improve human safety and preserve the environment for future generations.

## NMRDC'S Fleet Occupational Health Research Program And Navy Toxicology Studies

In certain operational environments Sailors and Marines are at risk of exposure to chemical and biological hazards that may threaten their health and degrade operational performance. New knowledge and techniques for understanding the hazards associated with unique Naval environments are being developed in order to reduce or prevent injury, improve safety, and optimize mission effectiveness.

The Fleet Occupational Health Research Area is one of seven NMRDC managed research programs. LCDR P. Knechtges, MSC, USN is the research area manager who is the central contact point between the laboratories, where the research takes place, and headquarters, where budget decisions are made and research planning and execution policy is established. LCDR Knechtges manages intramural and extramural research activities which includes several toxicology studies. The in-house research efforts are complemented by a contract and grant program with universities and private industry. In addition to core funded research programs, the toxicology program includes reimbursable funded work for routine toxicity testing of Navy materials.

Research efforts in toxicology focus on Navy-specific substances and exposure situations. The resulting research data are used to develop models predicting human exposure consequences in actual use situations, to tailor exposure limits during exposure conditions and to recommend medical surveillance and treatment guidelines.

This research program, like all NMRDC research programs, focuses on operational medicine. Unlike traditional medical care provided at military and civilian hospitals and clinics, operational medicine specifically focuses on the readiness and care of Sailors and Marines who train and work in an operational setting or a deployable status. It includes issues such as physical readiness, human performance, safety, and shipboard or field medicine. Emphasis is placed on disease and injury prevention and casualty care.

## Patent Issued On Controlled Risk Decompression Meter

Decompression sickness (DCS), sometimes called the bends, is a hazard to divers, aviators or astronauts who are subject to a reduction in atmospheric pressure. Despite much research, the detailed causes of DCS remain unknown, although most experts feel that a central role is played by expanding gas bubbles in body tissues. Research sponsored by NMRDC has resulted in an invention and patent for a decompression meter. The wrist-carried visual display meter can sense the actual pressure exposure and tailor a schedule for a user undergoing decompression. An individual moving from a high pressure environment to a low pressure environment will receive optimal decompression advice on how to proceed in a minimum of time without exceeding a specific acceptable risk of suffering DCS. The meter can also generate additional information related to risk management, response to unplanned decompression emergencies, efficient gas management planning, medical preparations for diving contingencies, and other situations.

## Researchers Examine The Mechanisms Involved In The Pathogenesis Of Alzheimer's Disease And Brain Injury

A hallmark of Alzheimer's disease (AD) is the formation of senile plaques and neurofibrillary tangles. One of the principal constituents of these is amyloid protein which is derived from amyloid precursor protein (APP). To date, no treatment has been developed to retard the accumulation of amyloid deposits which are thought to underlie the gradual decline in cognition which ultimately ends in death. Because many of the drugs developed to alleviate the symptoms associated with AD have met with very limited success, the major emphasis for intervention rests with understanding the mechanisms involved in the secretion and processing of APP and the deposition of amyloid in the brain. In a collaborative effort, researchers from the Naval Medical Research Institute, Bethesda, MD, the Bronx Veterans Administration, and the National Institutes of Health demonstrated that APP secretion can be induced by underactivity of neurons that produce the neurotransmitter acetylcholine (ACh) in the brain. An interesting aspect of the findings was that APP production remained high for many months after brain ACh levels were reduced, an observation that bears directly on the suggestion that the underlying formation of amyloid in AD may actually begin 10-20 years before obvious symptomatology is present. Recent evidence also suggests that the increased secretion of APP may also be an early marker for brains cells that are injured through other means. This research effort continues as part of a recently awarded three year VA-DoD research grant.

## Two Navy Inventors Receive First Royalty Payments For Licensing Of Patent Rights

RADM F. Sanford, MC, USN, Assistant Chief, Operational Medicine and Fleet Support presented checks to co-inventors Thomas Davis, Ph.D. and Kelvin Lee, M.D. of the Stem Cell Biology Branch, Immune Cell Biology Program at the Naval Medical Research Institute, Bethesda, MD. The two researchers received royalty payments for the licensing rights of their inventions. This exclusive license agreement resulted from research supported by a Cooperative Research and Development Agreement (CRADA) between the Navy and Cellco Inc., Germantown, MD. This is the first such license granted by a CRADA mechanism in the entire Navy. This CRADA was established in 1993 for the purpose of developing a deployable stem cell culture system. Dr. Davis and Dr. Lee are involved in Navy efforts that focus on culturing bone marrow stem cells outside of the body for the treatment of casualties caused by acute bone marrow injury. These inventors contributed to the development of a unique in vitro culture system that mimics the bone marrow microenvironment. Bone marrow stem cells give rise to all the mature elements in the blood such as red blood cells, neutrophils, monocytes, lymphocytes and platelets. The system is currently undergoing qualification for clinical use and is not yet commercially available. The Federal Technology Transfer Act (FTTA) allows the government to license government patents for royalties. The FTTA and SECNAVINST 5870.20D require that a percentage of the royalties are shared with the inventors. The remaining royalties are provided to the inventor's laboratory.

## Impact Of Infectious Diseases On U.S. Troops Deployed To The Persian Gulf During Operations Desert Shield/Desert Storm

Navy Infectious Disease researchers, in collaboration with Navy Preventive Medicine Officers, published an assessment of the impact of infectious diseases on U.S. troops deployed to the Persian Gulf during 1990 and 1991 in Clinical Infectious Diseases (June 1995). The incidence of non-battle injuries, including infectious diseases morbidity, was lower than any previous war involving U.S. military personnel. Infectious diseases were not a major cause of lost manpower, unlike the experience of Western troops in the Persian Gulf during WWII. This can be attributed to a combination of factors including the presence of a comprehensive medical care infrastructure which was capable of controlling many infectious disease problems like acute diarrhea, and the extensive preventive medicine effort by the U.S. military, which included continuous disease surveillance and rapid diagnostic support to quickly identify and correct health hazards. The primary cause of infectious disease morbidity among the 697,000 troops was mild diarrheal and respiratory disease. The most unexpected medical outcome of the deployment was the very low risk of arthropod-borne infections. The reason was probably due to the deployment of troops to the open desert during the cooler winter months, which provided the least favorable conditions for arthropod-transmitted diseases like sandfly fever and leishmaniasis. It is critical for the Navy to maintain an infectious diseases research program to develop new vaccines and more accurate and rapid diagnostic tests and improve medical treatments

## Advanced Color Night Vision Goggles

The achromatic imagery of the night vision goggles currently used by pilots during night operations is less than adequate in very low light/starlight conditions. This could result in pilot disorientation and lead to aircraft mishaps. Responding to this situation researchers at the Naval Postgraduate School, Monterey, CA and the Naval Aerospace Medical Research Laboratory, Pensacola, FL are developing an advanced technology demonstration of a color solid state vision system for aircraft. This new system will fuse visible light imagery from a low light charge coupled device (LLCCD) with infra-red thermal imagery from a forward looking infrared sensor to produce the fist color night display. This will be displayed through an aircraft color monitor or through a helmet mounted display. The long term goal of this project is to incorporate the technology into a variety of military platforms ranging from unmanned air vehicles, to tanks, to ships, to aircraft. This system will be a quantum leap forward in night operations and will significantly reduce night operation aircraft mishaps. Potential civilian applications include rescue operations and police surveillance.

## Navy Issued Patent For Compact, Portable Critical Care Unit For Hyperbaric And Recompression Chambers

Because of the many advances in diving equipment and procedures over the past 10 years, military and civilian diving is safer. However, it is still possible for a diver to experience a serious injury requiring advanced life support and recompression therapy. Most recompression chambers located close to sites where divers are working or recreating do not have advanced medical equipment to provide artificial ventilation or monitor vital signs. Working to resolve this problem, investigators at the Naval Medical Research Institute, Bethesda, MD developed and received a patent on a portable critical care system for use in hyperbaric and recompression chambers. The critical care unit increases the level of available life support for an injured diver who requires advanced care in an older model decompression or hyperbaric chamber not equipped with treatment equipment. The 70-pound self-contained, rapidly transportable unit

contains a ventilator, patient suction, and vital signs monitor that can operate without creating heat, sparks or other hyperbaric hazards. The alternative method to achieve this level of care would be to modify existing chambers which would be very expensive, take many years, and require recertification of all modified chambers.

## Cooperative Research and Development Agreements

A Cooperative Research and Development Agreement (CRADA) is a special type of agreement provided by Congress to advance technology transfer. Under a CRADA, a Federal Laboratory can "accept, retain, and use funds, personnel, services and property from collaborating parties and provide personnel, services and property to collaborating parties." The following CRADAs and were in effect in 1994:

### NMRI / PharMingen

**Goal:** To identify, develop and manufacture products from a Government developed mouse x mouse hybridoma cell line which produces at least a monoclonal antibody specific for mouse IgM antibody of the allotype, said cell line having been designated "DSI".

### NMRI / [A Medical Research Company]

**Goal:** To investigate, develop, and optimize agents used in biochemical, tissue culture and animal model systems to evaluate their capacity to inhibit the activity or infectivity of Dengue fever virus, P. falciparum, or other selected pathogens.

### NAMRU-3 / The Bioanthropology Foundation

**Goal:** To Study and develop, over a four-year period, information on the biology, distribution and risk factors of encountering poisonous snakes in various geographical areas in Egypt.

### NMRI / Repligen Corporation

**Goal:** To improve the techniques used to modify and regulate lymphokine gene expression in order to enhance the recovery of personnel with damaged immune systems, or to improve the response to vaccines, by manipulating a costimulatory pathway using the CD28, B7 and CTLA-4 receptors and their associated signal transduction pathways.

### NMRI / Integrated Diagnostics, Inc.

**Goal:** To develop and improve commercial serological diagnostic assays for various species of rickettsial diseases in clinical specimens, and to investigate and test the sensitivity and specificity of these assays.

### NMRI / Dyad Pharmaceuticals

**Goal:** To investigate the protective effects of antisense molecules against the inflammation associated with septic shock in animals, cell cultures, and human subjects, as well as develop these molecules as a treatment for septic shock.

### NAMRL / Electronic Health Technologies, Inc.

**Goal:** To investigate the potential usefulness of a medical device that would be used to increase the flow rates of blood and lymphatic fluid in the extremities

by combined use of mild hyperthermia and deep-layered muscle contraction in an effort to accelerate wound healing rates by virtue of localized increased oxygen perfusion.

**NMRI / The Centers for Disease Control / Genelabs Technologies, Inc.**

**Goal:** To facilitate diagnosis and to study information about the epidemiology, immunology, and molecular biology of the hepatitis E virus.

**NMRI / USAMRDC/WRAIR/Eniricerche**

**Goal:** To develop a safe and efficacious malaria vaccine to prevent or treat P. falciparum malaria through the development and characterization of highly purified clinical grade subunit malaria antigens and the formulation of these antigens in ways that are suitable for immunizing human subjects.

**NBDL / Snell Memorial Foundation**

**Goal:** To analyze human dynamic responses to impact acceleration and to determine the correlation of these responses with injury potential. The results of these analyses are expected to be applicable to the design, construction and validation of mathematical models of human impact responses.

**NHRC / Symtonic USA, Incorporated**

**Goal:** To investigate the value of the electromagnetic sleep induction device (LEET) for facilitating sleep in subjects who must work after shifting time zones or are moved from the day to the night shift.

**NAMRL / [A Commercial Airline]**

**Goal:** To exchange data and information about the performance of pilots who have served with both the Navy and the Airline. This information will include the results of screening tests evaluating psychomotor coordination, cognitive skills and various personality attributes.

**NMRI / Cellco, Incorporated**

**Goal:** To develop technology that will permit in vitro culture and expansion of human hematopoietic progenitor cells. A specific culture system will be tested for the ability to rapidly and significantly expand human hematopoietic stem cells for use in clinical situations such as autologous bone marrow transplantation and gene therapy.

**NMRI / MicroCarb, Incorporated**

**Goal:** To develop, test and evaluate the safety, immunogenicity and protective efficacy of prototype Campylobacter vaccines derived from organisms grown on mucus, mucus-derived components, defined or purified mucus components or their analogs.

**NAMRU-3 / Murex Corporation**

**Goal:** To evaluate rapid diagnostic assays for the detection of HIV antibodies in a high prevalence population in the Republic of Djibouti providing an actual field environment utilizing different body fluid sources compared against the "gold standard" serum HIV ELISA with confirmatory Western blot.

**NAMRU-2 / Hoffmann-La Roche Inc. (for Material & Funds Transfer)**

**Goal:** To compare the efficacy of mefloquine versus doxycycline as anti-malarial prophylactic agents of chloroquine-resistant malaria in Indonesia through a placebo-controlled, blinded trial and perform related research studies.

**NMRI / Molecular Devices Corporation**

**Goal:** To produce high affinity murine monoclonal antibodies and/or polyclonal sera to saxitoxin and fluorescein and investigate the sensitivity and specificity of these antibodies in rapid hand-held diagnostic assays and the threshold biosensor.

**NMRI / Vical Incorporated**

**Goal:** To collaborate in the evaluation of novel vaccine approaches for the prevention of malaria, by direct intramuscular administration of genetic material (DNA) encoding protein antigens derived from malaria parasites.

**NHRC / The University of Alabama at Birmingham**

**Goals:** To examine evidence for carriage and invasive disease due to mycoplasma species infections among Navy personnel diagnosed with pneumonia and to compare three diagnostic techniques for detecting pharyngeal colonization with mycoplasma.

**NAMRL / Bristol-Myers Squibb Company**

**Goal:** To provide information on the effects of lipid-lowering agents on complex cognitive and performance tasks. COGSCREEN, a computerized battery of performance tests will be administered to aviation personnel with elevated serum cholesterol values.

**NHRC / Biotronics Technologies, Incorporated**

**Goal:** For NMRDC/NHRC to receive technical, service and maintenance support for the Transcutaneous Analyte Measurement Method stationary instruments during the data collection and instrument evaluation phase of this project. In return, Biotronics will be provided with the data gathered during the study to be used to further develop and perfect the instruments.

**NAMRU-3 / Merck & Company, Incorporated (b)**

**Goal:** To investigate, develop and optimize Merck's recombinant vaccine for prevention of Hepatitis B in newborns. Clinical research study entitled

"Evaluation of Pediatric Dose of Recombinant Hepatitis B Vaccine in Newly Born Infants in Alexandria, Egypt."

**NMRI / Cytel Corporation**

**Goal:** To develop and test various types of constructs and formulations, based on specific synthetic peptide sequences derived from the Plasmodium parasites, potentially useful in the treatment and prevention of malaria.

**NMRI / Genelabs Technologies, Incorporated**

**Goal:** NMRDC/NMRI has a library of Hepatitis sera that will be provided to Genelabs for evaluation by Genelabs' Proprietary techniques. Data on those evaluation results will be provided to NMRDC/NMRI.

**NMRI / SyStemix, Incorporated**

**Goal:** To evaluate the porcine stromal culture system for licensure by SyStemix in connection with SyStemix' development effort to commercialize SyStemix' proprietary human hematopoietic stem cell process and expansion system for therapeutic purposes.

**NDRI / Jolley Consulting and Research, Incorporated**

**Goal:** To develop a dental/medical diagnostic instrument which is based on recombinant DNA produced monoclonal antibody fragment labeled with a fluorescence dye and detected by a fluorescence polarimeter.

**NMRI / SmithKline Beecham Corporation**

**Goal:** To develop a culture of murine hybridoma, the genetic information of which has potential for conversion to encode both chimeric antibodies and humanized antibodies, and investigate its appropriateness for the prevention of malaria.

**NMRI / Battelle Memorial Institute, National Security Division**

**Goal:** To produce purified goat antibodies to B. globigii and different preparations in relation to B. globigii and to evaluate the sensitivity and specificity of a new biosensor concept.

**NMRI / Steven Kessler, Ph.D.**

**Goal:** NMRDC/NMRI agrees to and authorizes Dr. Kessler to use the K6.1 hybridoma and its monoclonal antibody, which he developed while at NMRI, to practice and improve his invention and to license others to practice his invention and its improvements for so long as the K6.1 is needed to practice his invention and its improvements.

**NMRI / MicroCarb, Incorporated**

**Goal:** To develop, test and evaluate candidates for the large-scale production of a safe and effective vaccine for the prevention of diarrhea caused by enteropathogenic Campylobacter in humans.

**NAMRL / M.C.J. Corporation**

**Goal:** To develop effective therapies for various forms of vestibtilopathology, to include motion sickness, dizziness, headache, spatial disorientation, Meniere's Syndrome, post-head injury and post-traumatic vertigo patients utilizing non-invasive vestibular stimulating apparatus.

**NAMRL / NAMI / SunMart, Incorporated**

**Goal:** SunMart desires to assist the Navy with continued enhancement and improvements in the Multimedia Medical Translator, which is disclosed and claimed in U.S. Patent Application Serial No. 08/200,049 under which SunMart has applied for a non-exclusive license, by adding American Indian languages and developing additional scripts that will address the needs of other agencies such as the FBI and the DEA.

**NMRI / Pelagic Pressure Systems**

**Goal:** To transfer the newly developed Navy decompression algorithm for a new set of air and nitrogen/oxygen mixed gas decompression tables, run as a real time computer algorithm, to the private sector, thereby providing to the private sector an algorithm based on substantial and unique medical documentation and to provide the option of a commercialization license world-wide in applications of the Navy decompression algorithm.

**NMRI / Agracetus, Incorporated**

**Goal:** Collaborate in the development of plasmid DNA based vaccines for the prevention of malaria. The collaborative research will take advantage of an accelerated-particle gene delivery instrument, the Accell® gene gun developed by Agracetus, for direct intradermal administration of DNA encoding protein antigens derived from malaria parasites.

**NMRI / Kara Biologicals Diagnostic Research and Development**

**Goal:** To utilize reagents, clinical and environmental samples, developmental rapid diagnostic and detection technologies and field evaluation capabilities of NMRI in combination with the diagnostic reagent production, diagnostic assay production optimization and assay production capabilities of KBDRD to produce rapid diagnostic/detection assays for a variety of bacterial agents, toxins and antibodies to these agents.

## Patents

The following Patents were granted in 1994:

### NMRI / U.S. Patent 5,299,567; Minimal Elastance, Closed-Circuit Underwater Breathing Apparatus

**Abstract:** This invention comprises a minimal elastance underwater breathing apparatus (UBA) in which the elastance component of UBA impedance is substantially eliminated by forcing the breathing bag to expand and contract in a horizontal plane with small vertical displacements and hence minimal elastance. The invention further includes a servo-mechanism operating with a microprocessor, 3-axis position sensor and rotatable joints which act to keep the breathing bag oriented horizontally no matter what the diver's position. The principles of the present invention may be adapted to existing UBA with redesign and additions.

### NNMC / U.S. Patent 5,312,322; Three Point Extension to Treat Flexion Contractures About Limb Synovial Hinge Joints

**Abstract:** A three point extension splint device for correcting flexion contractures about limb synovial hinge joints. The splint device comprises a proximal contact means for contracting the proximal portion of an extremity above the flexion crease of a synovial joint and a distal contact means for contacting the distal portion of an extremity below the flexion crease of a synovial hinge joint. A springy, resilient bridge joins the proximal and distal extremity contact means. These three parts form a anterior assembly. A cupping means that forms the posterior assembly protects the bony prominence of the joint. An adjustable, releasable, strapping means joins the springy, resilient bridge to the cupping means to produce a downward, and centrifugal force in both extremity contact means proportionate to the amount of force exerted by the strapping means thereby causing a myofascial release by the longitudinal stretch of the major muscle and tendon extensions parallel to the long axis of the limb toward the synovial hinge joint while the superficial tissues are stretched in the opposite direction.

### NMRI / U.S. Patent 5,315,988; Reactive, Closed-Circuit Underwater Breathing Apparatus

**Abstract:** This invention comprises a tunable underwater breathing apparatus (UBA) in which the resonant frequency of the UBA may be adjusted to meet the diver's breathing frequency by controlling the inertance component of the UBA impedance. The principles of the present invention may be adapted to existing UBA with minor redesign and some additions.

## NMRDC STRATEGIC PLAN

### Mission

Our mission is to provide timely solutions to Navy and Marine Corps medical and operational problems through biomedical research, development, test, and evaluation.

### Vision

We will be an unparalleled provider of biomedical research products and services to the Navy.

We will be recognized by senior Navy leadership and the operational forces as a vital and integral Navy asset both during peace and war.

We will maintain a world-class scientific program and will be regarded by the national and international biomedical research communities as a vital international resource setting the standard for excellence in biomedical research.

We will each be empowered members of our multi-disciplinary biomedical research team and will continually strive to enhance our value to the Navy and our contributions to the health care of our Nation.

### Guiding Principles

We will view people as our most valuable resource.

We will keep our programs focused on current and anticipated Navy and Marine Corps needs.

We will communicate proactively with our customers on requirements, planning, and execution and will solicit their feedback on all aspects of our service.

We will foster vigorous staff participation in identifying, advocating, planning, and executing our programs.

We will encourage collaboration with other Department of Defense organizations, government laboratories, universities, and industry.

We will continually develop and use new technologies in our programs and will take every opportunity for technology transfer and dual-use.

We will nurture a creative research and development environment that encourages the free exchange of ideas, the highest ethical values, and the professional growth of our people.

We will establish a climate of trust and teamwork.

We will be committed to strong, competent scientific management and leadership.

We will continuously improve all aspects of our enterprise.

## Executive Summary

We are the Naval Medical Research and Development Command.

We are committed to a strategic planning process encompassing several goals that are fundamental to the quality, success, and growth of our research organization. These goals were forged to be consistent with our mission, the national defense strategy, an emphasis on dual use and technology transfer, and the realities of the current and projected research funding environment. We will implement each goal and carefully monitor its success, adjusting our plan over time to ensure that we continually meet defined Navy requirements, enhance our technological capabilities, and grow our research funding base.

These are our six strategic goals:

**GOAL #1: Identify and develop core biomedical research programs that meet Navy and Marine Corps needs:**

We will plan and implement only those scientific programs that are essential for meeting current and anticipated Navy and Marine Corps needs. In defining these programs, we will consult with warfighting and combat medical support users, resource and program sponsors, research managers, in-house laboratory scientists, and external experts.

**GOAL #2: Ensure that our research and development programs are of the highest quality:**

We will develop strategies to ensure the highest quality in our research and development planning, management, and execution. We will actively monitor our strengths and weaknesses, using customer feedback and peer review, and will redesign our programs as needed to preserve the scientific excellence of our organization.

**GOAL #3: Develop and execute powerful marketing strategies:**

We will design and implement program marketing strategies that highlight our capabilities and achievements. Our organization will be known as an essential Navy asset in peace and war, deserving strong support from our sponsors and from the Navy and Marine Corps line communities.

**GOAL #4: Consolidate our resources into a more efficient research organization:**

We will consolidate our scientific and management organizations to build a strong research center of excellence, effectively accomplishing the command and control, program management, research execution, and oversight necessary to achieve our defined performance objectives.

**GOAL #5: Create an environment of open communication and cooperative decision-making:**

We will implement policies and procedures that provide open participation, meaningful communication, and cooperative decision-making at all levels of our management, scientific, technical, and administrative staffs.

**GOAL #6: Respect and cultivate our human resources:**

We will develop and maintain the human resources needed for our mission and will support the development of each individual's full potential to contribute to our goals.

## Goals, Strategies and Objectives

**GOAL #1: Identify and develop core biomedical research programs that meet Navy and Marine Corps needs**

We will plan and implement only those scientific programs that are essential for meeting current and anticipated Navy and Marine Corps needs. In defining these programs, we will consult with warfighting and combat medical support users, resource and program sponsors, research managers, in-house laboratory scientists, and external experts.

**Strategy #1.1:** Identify and prioritize navy and marine corps medical and operational needs that can be met through biomedical research and development.

**Objective #1.1.1:** Establish a NAVMEDRSCHDEVCOM Director of External Relations to maintain liaison with resource sponsors, CINCs, subordinate Fleet elements, and others to create a list of current, validated medical and operational needs.

**Objective #1.1.2:** Establish a high level panel within the Office of the Director of Navy Test and Evaluation and Technology Requirements (N091) to review medical and operational needs and to establish and prioritize biomedical science and technology objectives.

**Strategy #1.2:** Develop and execute an affordable investment strategy with a maximum return on investment.

**Objective #1.2.1:** Develop an internal capability to remain current on all changes in funding and end-strength projections during the PPBS process and during Congressional budget deliberations.

**Objective #1.2.2.** Develop a formal investment decision algorithm to be used Command-wide to assist in the development of an investment strategy. The algorithm will consider the identified need/requirement, the scientific risk, the projected return on investment, funding availability, and the degree of current customer satisfaction.

**Objective #1.2.3:** Establish a Program Area Advisory Committee for each research area to assist the Research Area Manager in developing an investment strategy for that area.

**Objective #1.2.4:** Appoint a NAVMEDRSCHDEVCOM Senior Scientific Advisory Board to advise on emerging technological opportunities and to assist the Director of Research and Development in formulating an overall investment strategy for the Command.

**Objective #1.2.5:** Cooperate closely with ASBREM in all aspects of program planning to ensure Tri-Service coordination and program acceptance by the DoD.

**Objective #1.2.6:** Optimize the use of discretionary funds (e.g., IR, ARI) for probing new areas of potential investment.

**Objective #1.2.7:** Protect the highest priority programs and investigate alternative strategies for accomplishing lower priority programs whenever funding shortfalls occur.

**Objective #1.2.8:** Establish and execute a plan to divest those areas that are not supported by current customers and for which no alternative funding source can be identified. Issue a letter of intent to terminate to all stakeholders.

**Strategy #1.3:** Document the core programs in program master plans.

**Objective #1.3.1:** Develop and maintain a Navy Medical Science and Technology Master Plan, incorporating accomplishments, goals, program phase-in/phase-out strategies, and approaches for executing the 6.1, 6.2, and 6.3A programs.

**Objective #1.3.2:** Develop and maintain a Navy Medical Development Master Plan, incorporating accomplishments, goals, program phase-in/phase-out strategies, and approaches for executing the 6.3B, 6.4, and 6.5 programs.

**GOAL #2: Ensure that our research and development programs are of the highest quality**

We will develop strategies to ensure the highest quality in our research and development planning, management, and execution. We will actively monitor our strengths and weaknesses, using customer feedback and peer review, and will redesign our programs as needed to preserve the scientific excellence of our organization.

**Strategy #2.1:** Establish procedures that foster the scientific and technical excellence of our individual work units and contracts.

**Objective #2.1.1:** Institute a process of rigorous in-house scientific and technical review before proposals are submitted for funding.

**Objective #2.1.2:** Establish a process of external peer review of proposals, ensuring that the reviewers' constructive criticisms are addressed before proposals are funded.

**Objective #2.1.3:** Create opportunities that allow in-house investigators to compete for research funding. (See also Objective #1.2.6)

**Strategy #2.2:** Develop and execute a system that monitors our programs' strengths and weaknesses and provides guidance for improvement.

**Objective #2.2.1:** Ensure continual in-house monitoring of our programs' scientific quality during the entire period of performance.

**Objective #2.2.2:** Establish a policy of external peer review for existing programs, ensuring the reviewers' constructive criticisms are addressed.

**Objective #2.2.3:** Ensure that customer satisfaction is continuously monitored during program execution. (See also Objectives #3.2.1 and #3.2.2)

**GOAL #3: Develop and execute powerful marketing strategies**

We will design and implement program marketing strategies that highlight our capabilities and achievements. Our organization will be known as an essential Navy asset in peace and war, deserving strong support from our sponsors and from the Navy and Marine Corps line communities.

**Strategy #3.1:** Build a strong marketing infrastructure.

**Objective #3.1.1:** Establish a NAVMEDRSCHDEVCOM Director of External Relations to coordinate all marketing and domestic technology transfer efforts. (See also Objective #1.1.1)

**Objective #3.1.2:** Obtain the services of a marketing consultant to ensure a successful marketing program.

**Objective #3.1.3:** Train staff in basic marketing techniques.

**Objective #3.1.4:** Build a portfolio of successful products, services, and research achievements, including examples of outstanding service responsiveness.

**Objective #3.1.5:** Maintain strong briefing packages on all program areas including high impact graphics and hands-on demonstration items. Obtain contractor support where needed to implement this objective.

**Objective #3.1.6:** Convene two meetings per year of the Commanding Officers, Scientific Directors, and Research Area Managers to plan specific marketing strategies. (See also Objective #5.2.2)

**Objective #3.1.7:** Develop ad hoc Marketing Groups to market specialty areas. These groups will be composed of individuals most knowledgeable in each specialty area. Coordination will be provided by the Director of External Relations.

**Objective #3.1.8:** Distribute a directory of principal investigators and their projects and a consolidated phone book containing all NAVMEDRSCHDEVCOM personnel.

**Strategy #3.2:** Strengthen our current customer base.

**Objective #3.2.1:** Establish Operator Advisory Groups within each program area to enhance communication among the sponsor, developer, and user communities. These groups will facilitate product transition and identify new opportunities for research and development. They also will keep NAVMEDRSCHDEVCOM up-to-date on current customer funding trends, reorganization projections, and changing needs.

**Objective #3.2.2:** Develop and execute a formal system that monitors how the sponsor and user communities perceive the quality of our services.

**Objective #3.2.3:** Initiate aggressive marketing efforts that build on areas of current capability, correct problems that cause dissatisfaction, and retain funding support for critical research areas.

**Strategy #3.3:** Identify and establish new customers.

**Objective #3.3.1:** Develop and execute a marketing plan that identifies potential new customers within and outside the Navy and establishes ways to initiate funding from these sources.

**Objective #3.3.2:** Provide all potential funding sponsors a brief description of our capabilities and possible initiatives for solutions to their problems.

**Objective #3.3.3:** Initiate efforts to bring ARPA into ASBREM.

**Objective #3.3.4:** Consistent with the Command's mission and functions, encourage all scientists to seek additional funding from outside sources, to include grants, reimbursable work orders, joint ventures with other government partners, and cooperative research and development agreements with industry and academe.

**Objective #3.3.5:** Actively seek opportunities to collaborate with foreign military and civilian investigators, including the development of new international cooperative agreements and funding mechanisms.

**Objective #3.3.6:** Identify ways to increase direct interaction between investigators and users within the operational environment ("Scientists at Sea," participation in Marine Corps exercises, etc.).

**Objective #3.3.7:** Identify and attend warfare community planning meetings.

**Objective #3.3.8:** Publish in both scientific and lay journals with broad readership. Attend and present our products at large society meetings.

**Objective #3.3.9:** Increase the use of press releases and other media vehicles to highlight research and development successes.

**Strategy #3.4:** Strengthen relationships with key DoD and Congressional officials.

**Objective #3.4.1:** Establish strong links to the CINCs and subordinate Fleet elements. (See also Objective #3.1.1)

**Objective #3.4.2:** Establish strong advocacy within the Office of the Assistant Secretary of the Navy for Research, Development and Acquisition and the Office of Naval Research. Aggressively recruit an SES NAVMEDRSCHDEVCOM Technical Director.

**Objective #3.4.3:** Continuously seek opportunities to provide informational briefings to Congress.

**GOAL #4: Consolidate our resources into a more efficient research organization**

We will consolidate our scientific and management organizations to build a strong research center of excellence, effectively accomplishing the command and control, program management, research execution, and oversight necessary to achieve our defined performance objectives.

**Strategy #4.1:** Aggressively eliminate all unnecessary overhead expenses within the current navmedrschdevcom system.

**Strategy #4.2:** Consolidate the navmedrschdevcom system to further streamline infrastructure and reduce overhead costs. Preserve core scientific programs to the greatest extent possible.

**Objective #4.2.1:** Review current programs for alignment with out-year resource projections. Make retention, downsizing, and divestiture decisions.

**Objective #4.2.2:** Determine program areas where critical mass can be preserved and infrastructure reduced by consolidation.

**Objective #4.2.3:** Create a new organizational structure for NAVMEDRSCHDEVCOM that optimizes the use of projected resources.

**Objective #4.2.4:** Identify and acquire the space necessary to support the new organization.

**Objective #4.2.5:** Establish a POA&M for consolidation that minimizes the disruptions to individuals, their families, and the research effort.

**Objective #4.2.6:** Establish an immediate capability to counsel and assist employees affected by the consolidation.

**GOAL #5: Create an environment of open communication and cooperative decision-making**

We will implement policies and procedures that provide open participation, meaningful communication, and cooperative decision-making at all levels of our management, scientific, technical, and administrative staffs.

**Strategy #5.1:** Embrace and implement total quality leadership (TQL).

**Objective #5.1.1:** Establish a policy for the Command-wide implementation of TQL and provide implementation guidance.

**Objective #5.1.2:** Provide resources and develop an infrastructure to support TQL. Train appropriate personnel.

**Objective #5.1.3:** Learn about TQL implementation successes and failures at other research and development activities. Share these lessons widely.

**Objective #5.1.4:** Use TQL to explore ways to improve research and business processes to produce greater effectiveness and efficiencies.

**Strategy #5.2:** Increase the number and effectiveness of channels for communication and problem-solving within the command.

**Objective #5.2.1:** Establish a NAVMEDRSCHDEVCOM Director of Management Information Systems to identify current database/communications needs, project future needs, and develop a comprehensive, cost-effective information/communication system to meet these needs. Employ contractor support as needed.

**Objective #5.2.2:** Convene two meetings per year of the NAVMEDRSCHDEVCOM senior leadership to discuss current issues, review Command goals and strategies, and plan future efforts.

**Objective #5.2.3:** Strongly encourage individual investigator input to and participation in Program Area Advisory Committees, Operator Advisory Groups, Marketing Groups, and program briefings.

**Objective #5.2.4:** Solicit feedback on ways to improve the *Outlook* as a communications vehicle.

**Objective #5.2.5:** Annually update the directory of principal investigators and their projects and the consolidated phone book containing all NAVMEDRSCHDEVCOM personnel. (See also Objective #3.1.8)

**Objective #5.2.6:** Establish a working group to establish additional mechanisms to solicit regular and frequent feedback from staff members on critical issues.

**GOAL #6: Respect and cultivate our human resources**

We will develop and maintain the human resources needed for our mission and will support the development of each individual's full potential to contribute to our goals.

**Strategy #6.1:** Create and maintain a human resources management program that will ensure the recruitment, retention, and promotion of only the highest quality individuals.

**Objective #6.1.1:** Develop a human resource planning capability that will systematically identify and display future recruitment needs through an analysis of out-year program plans, current personnel inventories, and projected retirements, resignations, and rotations.

**Objective #6.1.2:** Institute aggressive succession planning for all core military and civilian positions as soon as the need is identified.

**Objective #6.1.3:** Offer prospective civilian scientists opportunities to demonstrate technical capability and to market and build programs as a way of demonstrating their effectiveness and value to the organization before hiring as a permanent employee.

**Objective #6.1.4:** Establish search committees to fill all senior civilian scientific and executive positions. Use recruitment/retention bonuses to attract the most qualified candidates.

**Objective #6.1.5:** Establish a military research career path for each Corps and specialty that will ensure development of a proper knowledge and experience base, garner peer recognition, and afford an equitable promotion opportunity. Lengthen military researcher tour lengths to five years.

**Objective #6.1.6:** Develop a capability for rapidly and systematically identifying military medical department personnel with prior research experience who are not currently in the R&D system.

**Objective #6.1.7:** Work aggressively with specialty advisors and detailers to fill military positions with only the most qualified personnel.

**Objective #6.1.8:** Whenever possible, use in-house contractors to fill vacancies in non-core scientific and technical staff. Perform reimbursable and other short term work with in-house contractors to the greatest extent possible.

**Objective #6.1.9:** Renew commitment to an objective, performance-based civilian performance evaluation system.

**Objective #6.1.10:** Develop Command-wide objective promotion criteria for senior scientific personnel. These criteria will be based on demonstrated scientific productivity and leadership beyond the basic requirements of the Research Grade Evaluation Guide.

**Strategy #6.2:** Develop military and civilian employees for scientific and management leadership roles. Build credentials to ensure their respect in the biomedical and/or warfare communities.

**Objective #6.2.1:** Actively encourage continuing education and professional development. Write and execute an individual development plan for each military and civilian employee.

**Objective #6.2.2:** Encourage active participation in professional societies including presentations at meetings and assumption of leadership roles.

**Objective #6.2.3:** Arrange for laboratory staff to spend time with program management staff, senior DON and DoD officials, and warfare communities to experience the mechanisms used to set requirements, establish programs, and determine funding.

**Objective #6.2.4:** Provide copies of the Science and Technology and Development Master Plans to all professional staff so that the

direction of their professional growth will be consistent with the overall NAVMEDRSCHDEVCOM direction.

**Objective #6.2.5:** Establish and foster environments which support mentoring through post-doctoral fellowships, internships, summer faculty programs, graduate student or student aid programs, and positive access to senior scientists.

**Objective #6.2.6:** Provide quality investigators opportunities for innovative research. Support additional training to permit them to undertake leadership in new thrust areas, independence in making research decisions, control of day-to-day research resources, and group leadership for scientific decision making.

**Objective #6.2.7:** Develop specific methods to identify future professional and technical requirements for the Command. Establish training/retraining programs to develop scientists and managers in areas of projected need.

**Strategy #6.3:** Create reward systems that recognize achievement and motivate performance.

**Objective #6.3.1:** Base annual civilian performance awards solidly on demonstrated performance and support of Command objectives. Negotiate "win-win" agreements when setting performance standards to avoid ambiguity and surprise. Use peer evaluation as a reliable and valid source of information about the contributions of individuals.

**Objective #6.3.2:** Give special act awards immediately. Ensure they are associated with specific, well-publicized achievements.

**Objective #6.3.3:** Use non-monetary group and individual awards and recognition liberally. Let no good deed go unrecognized.

**Objective #6.3.4:** Establish an annual award for the best scientific achievement Command-wide.

**Objective #6.3.5:** Establish a working group to seek new reward mechanisms that encourage innovation, creativity, and teamwork.

**Strategy #6.4:** Recognize all employees as stakeholders. Provide opportunities for employee influence.

**Objective #6.4.1:** Make active participation a way of life for all staff members. Involve everyone in continuous process improvement and Command goal setting. Regard everyone as a leader.

**Objective #6.4.2:** Establish a working group to establish mechanisms to solicit regular and frequent feedback from employees on common sources of dissatisfaction. Identify and break the barriers that interfere with developing and maintaining employee influence.

**Objective #6.4.3:** Actively give employees contact with the users of their output so that employees clearly understand the importance and utility of their efforts.

**Objective #6.4.4:** Open feedback channels to employees so they get as much information as possible, as directly as possible, about the results of their work.

**Objective #6.4.5:** Continually explore methods to promote job autonomy, reduce role ambiguity and conflict, and increase the responsibility and authority among staff members.

## January

LCDR L. Hayes (Code 01) provided PE 6.5 briefing to NAVCOMPT

1-8 CDR C. Schlagel (Code 43) made site visit to NAMRU-3

5 CDR C. Schlagel (Code 43) attended Campylobacter Symposia, University of Alexandria, Egypt and visited Dr. Mourad, Chairman, Department of Microbiology, University of Alexandria, Egypt

13 CAPT R. Carter (Code 04) at NHRC; briefed RADM Pilling on the 733 Study

14 Mr. J. Aronberg - budget analyst (Code 112) reported aboard

21 Farewell for HM2 Rosario

## February

1 CDR C. Schlagel (Code 43) attended Infectious Diseases Steering Committee meeting

3 CAPT R. Carter (Code 04) briefed HASC and SASC Congressional staff on recently completed ATDs

8-11 Mr. J. Aronberg (Code 112) attended Defense Civilian Payroll System (DCPS) Training at Charleston, SC

12-14 CDR C. Schlagel (Code 43) attended JTCG-2 Joint Working Group meeting

15 LCDR L. Hayes (Code 01) conducted a proposed POM 96 realignment briefing to CAPT R. Wagoner (N801)

18 Farewell for HMCM K. Pedersen, USN

21-22 CDR C. Schlagel (Code 43) participated in Navy Epidemiology Board, Norfolk, VA

23-28 CDR C. Schlagel (Code 43) attended MMCAR Retreat, Easton, MD

28 CAPT R. Carter (Code 04) briefed NMRDC/NMRI on Product Lines Strategy

## March

1 First Roundtable meeting for medical S&T requirements

2 CDR Schlagel (Code 43) attended Infectious Diseases Steering Committee meeting

3 ARI Selection Panel meeting

CDR C. Schlagel (Code 43) attended Army Environmental Health Agency Lyme Disease meeting

11 Base Structure Analysis Team (BRAC) meeting attended by CAPT J. Cecil, (Code 09) and CAPT R. Carter (Code 04)

21 LCDR L. Hayes (Code 01) conducted a proposed POM 96 realignments briefing for CAPT S. Westover (N912R) and Mr. H. Applegate (N912R3)

CDR Monroy, MSC, USN arrived for 12 days TEMAC, advised CAPT Flynn (Code 01) and Dr. Zornetzer of integrated management of Navy medical R&D

23 CAPT R. Carter (Code 04), CAPT Patee (NBDL) and CDR Dolgin (NBDL) meet Dr. D. Rossi, Head of ONR Industrial Programs, to discuss technology transfer cooperation

29 Award to LTC McCullen (Code OOC)

## April

5 CDR C. Schlagel (Code 43) attended Infectious Diseases Steering Committee meeting

8 CDR C. Schlagel (Code 43) attended Plaque Vaccine Program Review

12 Meeting of ONR/NMRDC program management staff to discuss cooperation in integrated management of Navy medical R&D

14 CDR C. Schlagel (Code 43) attended ETEC Vaccine Steering Committee meeting

15 CDR C. Schlagel (Code 43) attended JTCG-2 Joint Working Group meeting

19 CAPT R. Carter (Code 04) briefed Navy Research Advisory Committee on Navy Medical R&D

CAPT R. Carter (Code 04) briefed ONR and NRL Staff on Navy Blood Research Program - The Big Picture

21 Medical Requirements Roundtable results briefed to N-91, N-80 and ONR

23-29 CAPT R. Carter (Code 04) attended Navy Command Leadership Course

25 CDR C. Schlagel (Code 43) attended Forward Deployable Lab Doctrine meeting

27 RADM Dorman and RADM Fisher visit NMRI

27-28 CDR C. Schlagel (Code 43) attended Gulf War Mystery Illness review at NIH

## May

2 Ms. M. Gilbertson started as Code 04 secretary

4 CDR Schlagel (Code 43) attended Infectious Diseases Steering Committee meeting

5 CDR C. Schlagel (Code 43) attended ETEC Vaccine Steering Committee meeting

9 CAPT R. Carter (Code 04) briefed Congressional staff and N911 on medical ATD programs

12 Dean Crisp from University of New Orleans visited CAPT Flynn (Code 00) to discuss the future of NBDL

16-20 CAPT R. Carter (Code 04) served on ONR team reviewing ONR training R&D programs in San Diego and Orlando

21-22 CDR C. Schlagel (Code 43) attended International Society of Vaccines meeting

22-25 CDR C. Schlagel (Code 43) attended American Society of Microbiology annual meeting

17 CDR C. Schlagel (Code 43) attended Brucella Vaccine program review

18 CDR C. Schlagel (Code 43) attended JTCG-4 meeting

20 Farewell/Retirement for CAPT Thalmann; CAPT T. Jones, MSC, USN reported aboard

24-26 CAPT R. Carter (Code 04) and CDR T. Singer (Code 41) introduced Dr. Majde to MED-02 double digit codes

31 LCDR L. Hayes (Code 01) provided NAVAIR briefing

Farewell Luncheon for HM1 T. Wilson (Code 132)

31 CAPT R. Carter (Code 04) participated on ONR team reviewing Human Factors R&D programs in San Diego (through 3 Jun)

## June

1 U.S. Naval Mecical Research Unit No. 2 closed

CDR C. Schlagel (Code 43) attended Infectious Diseases Steering Committee meeting

2 NMRDC Command picnic, Farewell to CAPT Flynn (Code 00)

10 NMRDC Change of Command Ceremony, CAPT Jones relieves CAPT Flynn (Code 00)

CAPT R. Carter (Code 04) briefs Naval Studies Board of National Research Council, regarding Navy medical R&D

14 CDR C. Schlagel (Code 43) attended Flavivirus Vaccine Steering Committee meeting

20 CAPT T. Jones (Code 00) courtesy call to USAMRDC (BG Zajtchuk)

21-22 CDR C. Schlagel (Code 43) attended Group A Strep review

24 NMRDC Sexual Harassment Awareness Training given by M.A. Tartler (Code 020)

27 CAPT R. Carter (Code 04) represents BUMED at Navy meeting on Federal Support for Historically Black Colleges and Universities and Minority Institutions

29 CAPT R. Carter (Code 04) chaired meeting of women's issues points of contact from all Navy headquarters, to define Navy priorities for Defense Women's Health Research Program

CDR C. Schlagel (Code 43) attended an In Process Review at USAMMDA

30 LTC McCullen (Code 00C) departs on PCS

30 CAPT R. Carter (Code 04), CAPT Ehrhardt (Code 00B), CDR Hawkins (ONR) and CAPT Coolbaugh (ONR) attend inaugural interService meeting to define Armed Forces Medical R&D Agency

## July

1 CAPT T. Jones (Code 00) attended NNMC Change of Command

5 LTC J. Bley (Code 00C) reported aboard; HM2 L. Jackson, USN - supply and logistics (Code 132) reported aboard

CDR Schlagel (Code 43) attended Navy Epidemiology Board meeting

6 CDR Schlagel (Code 43) attended ETEC Microencapsulation Planning meeting and Infectious Diseases Steering Committee meeting

6-8 CAPT T. Jones (Code 00) attended ESC training workshop

7-8 CDR C. Schlagel (Code 43) attended Armed Forces Epidemiology Board meeting

11 CAPT T. Jones (Code 00) conducted Captain's Call

12 CDR C. Schlagel (Code 43) attended Shigella Vaccine Steering Committee meeting

Farewell Luncheon for C. Eisemann (Code 42)

15-23 CDR C. Schlagel (Code 43) made site visit to NAMRU-3

19 CAPT T. Jones (Code 00) HRO/CO Courtesy Call

22 Farewell Ceremony for V. Parish (Code 01S)

24-30 CDR C. Schlagel (Code 43) made site visit to NAMRU-2

26 CAPT T. Jones (Code 00) toured NDRI DET

26 CAPT R. Carter (Code 04) attended inter-Service meeting to define in-house portion of DWHRP

27 LTC J. Bley (Code 00C) assistance visit to CIP at NMC Portsmouth, VA

28 LTC J. Bley (Code 00C) AAALAC presentation at WRAIR

## August

1-2 CDR C. Schlagel (Code 43) attended MAMP conference

3 CDR C. Schlagel (Code 43) attended Infectious Diseases Steering Committee meeting

4 LTC J. Bley (Code 00C) assistance visit to NMRI

5 Farewell luncheon for CAPT Cecil (Code 09)

8 CDR C. Schlagel (Code 43) attended R&D Review for GEN Thurman

9 CDR C. Schlagel (Code 43) attended S&T Review for ASBREM

10 RADM R. Gilbertson visits NMRDC

11 LTC J. Bley (Code 00C) presentation to the WRAIR Topical Medicine Course: "The Army Veterinarians and Human Health"

15 CAPT R. Carter (Code 04) briefed Congressional "earmarked " programs to ASD(HA) Dr. Joseph

18 CAPT R. Carter (Code 04) met with Dr. Bailey of ASD(HA) re-earmarked programs

19 CAPT R. Carter (Code 04) attended change of office of outgoing Chief of Chaplains, RADM D. White

LTC J. Bley (Code 00C) Bethesda "Campus" animal facility consolidation meeting

20 LTC J. Bley (Code 00C) presentation to the annual Army Vet Fall Conference: "Nonhuman Primate Zoonotic Diseases"

21 LTC J. Bley (Code 00C) presentations to the NCAB AALAS Annual Meeting: "Leishmaniasis: Something Old, Something New"; "Nonhuman Primate Retroviruses: An Overview"

23 CAPT T. Jones (Code 00) attended RADM Scott's retirement

24 NMRID Change of Command

24 LTC J. Bley (Code 00C) presented a brief to the interagency research animal committee at NIH: "Congressional Questions and Draft DoD Directive"

25 CAPT T. Jones (Code 00) attended reception for RADM Buckendorf at German Embassy

26 CDR M. Lilienthal, MSC, USN reported aboard

27 CAPT T. Jones (Code 00) attended RADM Buckendorf's retirement

29-30 LTC J. Bley (Code 00C) attended the U of IL annual fall veterinary conference

31 MSC Luncheon

## September

8 CDR Schlagel (Code 43) attended Infectious Diseases Steering Committee meeting

9 CAPT T. Jones (Code 00) TAD to Cocoa Beach, FL to observe Space Shuttle takeoff

14 CDR C. Schlagel (Code 43) attended Campylobacter Vaccine Steering Committee meeting

15 NAMRU-3 Change of Command

22 RADM Fisher, MSC met with NNMC MSC officers for breakfast

24-27 CDR C. Schlagel (Code 43) to Naval Medical Doctrine Center to draft "Forward Deployable Laboratory" doctrine

30 Dr. S. Halstead visits NMRDC

## October

1 CNO established NMRI EMR Detachment at Brooks AFB San Antonio, TX. Authorized personnel are officers - 3, enlisted - 3, and civilian - 13

2 Surgeon General's Conference

LCDR L. Hayes (Code 01) implemented DCPS

5 Kickoff meeting between NMRDC staff and peer review contractor, Labat-Anderson, Inc.

MSC Leadership Conference

CDR C. Schlagel (Code 43) attended Infectious Diseases Steering Committee meeting

6 LTC J. Bley (Code 00C) visited by LTC Kerry Taylor from NAMRU-3

7 CDR C. Schlagel (Code 43) attended JTCG-4 meeting

9 CAPT T. Jones (Code 00) TAD to NBDL

11 LTC J. Bley (Code 00C) NDRI/USADRD consolidation meeting - WRAIR

13 NMRDC staff briefed RADM Sanford on Navy medical R&D

CDR C. Schlagel (Code 43) briefing for RADM Sanford

14 CDR C. Schlagel (Code 43) attended Campylobacter Vaccine Steering committee meeting

18 CAPT R. Carter (Code 04) briefed N911 on medical S&T requirements process

19 CAPT R. Carter (Code 04) briefed MED-02 staff on medical S&T requirements process

20 Dr. Osterman briefed NMRDC on his view of DoD medical R&D

S&T Review

CDR C. Schlagel (Code 43) participated in Infectious Diseases Rapid Diagnosis workshop

21 Service S&T officials, Dr. Osterman, Dr., Dorman, describe problems of military operational medicine; appoint CAPT R. Carter (Code 04) to head inter-Service working group to resolve those problems

24 VADM Hagen briefed on RDA-21

CDR C. Schlagel (Code 43) attended 2nd Annual Conference on Mucosal Immunization

25 LTC J. Bley (Code 00C) presentation on the new animal regulations to ONR, Ballston

26 CAPT R. Carter (Code 04) briefs results of working group to Dr. Dorman, ASN(RDA), Dr. Osterman and other secretariat-level officials

27 CAPT T. Jones (Code 00) TAD to San Antonio, TX

27-28 LCDR L. Hayes (Code 01) participated in ground breaking ceremony for NMRI EMR Det at Brooks AFB, San Antonio, TX

## November

1 CAPT W. Bishop, MSC, USN reported aboard

2 CDR Schlagel (Code 43) attended ONR IR review and Infectious Diseases Steering Committee meeting

3 NMRDC Code 04 staff present a review of in-house independent research for ONR sponsors

CAPT T. Jones (Code 00) attended USAMRDC Rededication Ceremony

LTC J. Bley (Code 00C) NDRI/USADRD consolidation meeting - Ft Meade

4 LCDR L. Fenton (Code 411) promoted to CDR, USNR

7 LTC J. Bley (Code 00C) visit by LTC Ross Graham from NAMRU-2

15 LTC J. Bley (Code 00C) presentation to AFIP, DLAM: "Cercopithecine Herpevirus 1"

16 NMRDC staff brief RADM Dysart on Navy medical R&D

17 HRO Retreat for CAPT Hibbs (Code 09)

CDR C. Schlagel (Code 43) attended NIH Group A Strep workshop

18 CDR C. Schlagel (Code 43) attended Army/Navy OCONUS Infectious Diseases meeting

21-22 CAPT T. Jones (Code 00) conducted 1994 NMRDC Commander's Conference; LCDR L. Hayes (Code 01) presented: "Projected Resources Regarding Facilities, Funding and Personnel"

22 LTC J. Bley (Code 00C) presentation to Navy Lab Commanders' conference: "DoD Directive and the Annual Report to Congress"

23 LCDR L. Hayes (Code 01) was assigned project officer for BRAC-95 scenarios (Completed all scenarios by 9 Jan 95)

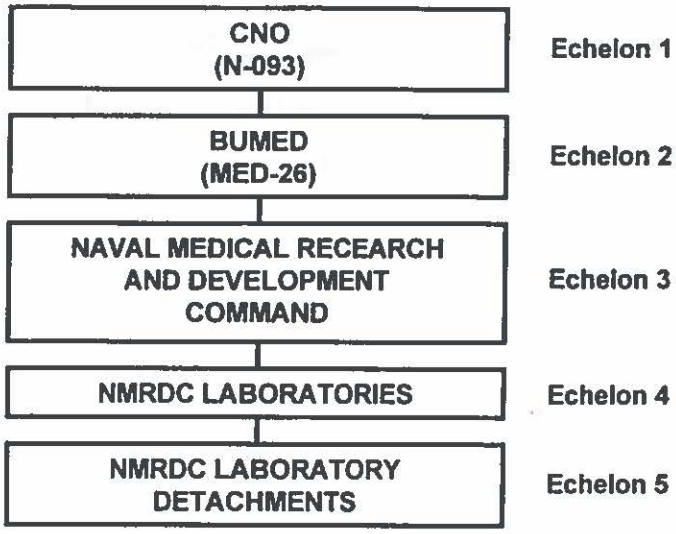
29 LTC J. Bley (Code 00C) visit by COL Cliff Johnson, Chief, US Army Vet Corps

30 LTC J. Bley (Code 00C) NDRI/USADRD consolidation meeting - Great Lakes, IL

## December

| | |
|---|---|
| 1 | LTC J. Bley (Code 00C) presentation to the Navy CIP conference at Crystal City: "DoD Directive and Animal Regulatory Update" |
| 2 | CAPT Cecil received award from NMRDC at BUMED |
| 2-8 | CDR Schlagel (Code 43) made site visit to AFRIMS |
| 5-9 | LCDR L. Hayes (Code 01) performed Command Inspection of NAMRL |
| 7 | CAPT T. Jones (Code 00) attended RDA-21 team meeting |
| 12-15 | RDA-21 meeting to define staffing of new WRAIR building, and to refine RDA-21 pillar issues |
| 14-17 | LTC J. Bley (Code 00C) assistance visit to NRaD and CIP NMC Balboa, San Diego |
| | LTC J. Bley (Code 00C) NDRI/USADRD Engineer/Architect meeting at CIP, NMC Portsmouth |
| 19 | CDR Schlagel (Code 43) attended Infectious Diseases Steering Committee meeting |
| 22 | CAPT T. Jones (Code 00) conducted NMRDC awards ceremony |

## Naval Medical Research and Development Command




The Commanding Officer, NMRDC is subject to the area and regional coordination authority of the Commandant, Naval District Washington, DC. The National Naval Medical Center provides host support.

Functions of the Commanding Officer, NMRDC as directed by the Chief, Bureau of Medicine and Surgery (BUMED):

- Command Navy Medical Department research and development laboratories, and support their Research and Development Test and Evaluation (RDT&E) missions by providing and exercising accountability for manpower, funds, facilities, and equipment resources.
- Direct, plan, program, budget, and document the Navy Medical research and development program.
- Determine the requirements for, and recommend the procurement, training, assignment, and distribution of research and development personnel.
- Perform staff functions for, and advise BUMED on RDT&E matters.
- Provide professional medical and dental guidance in the planning of Navy and Marine Corps weapons systems, life support systems, and personnel protection.
- Implement Medical Department policies and oversee the use and protection of human subjects utilized in research and development studies conducted by, within, and for Department of the Navy (DON).
- Direct and coordinate efforts to ensure a smooth transition of research results and other activities as required to support BUMED's mobilization missions.
- Execute Medical Department responsibilities in relation to the use and protection of animals utilized in research and development studies conducted by, within, and for DON.
- Develop and maintain mechanisms to ensure rapid and effective dissemination of research derived information to all appropriate end users.
- Coordinate research efforts by subordinate activities with other Navy commands and offices, other government agencies, civilian organizations, and foreign governments.
- Provide or undertake such other functions that may be authorized or directed.

## Component Activities

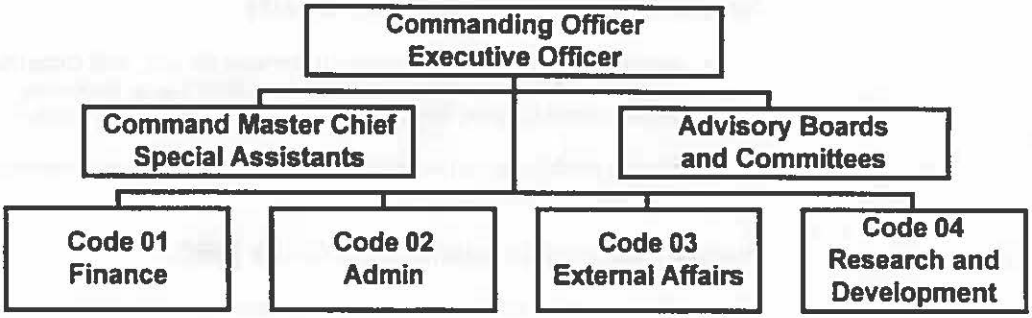
### Echelon 4

- Naval Aerospace Medical Research Laboratory, Pensacola, FL
- Naval Biodynamics Laboratory, New Orleans, LA
- Naval Dental Research Institute, Great Lakes, IL
- Naval Health Research Center, San Diego, CA
- Naval Medical Research Institute, Bethesda, MD
- Naval Submarine Medical Research Laboratory, Groton, CT
- U. S. Naval Medical Research Unit No. 2, Jakarta, Indonesia
- U. S. Naval Medical Research Unit No, 3, Cairo, Egypt

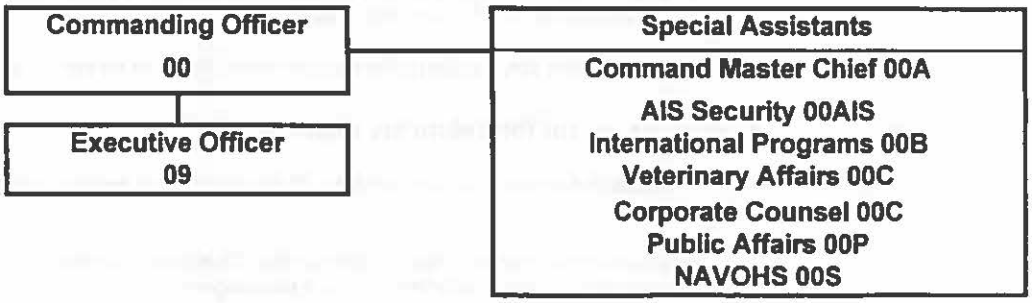
### Echelon 5

- Naval Dental Research Institute Detachment, Bethesda, MD
- Naval Dental Research Institute Detachment, San Antonio, TX
- Naval Medical Research Institute Detachment, Lima, Peru
- Naval Medical Research Institute Toxicology Detachment, Wright-Patterson Air Force Base, OH
- U. S. Naval Medical Research Unit No. 2 Detachment, Manila, RP

## NMRDC Command Organization




## Office Of The Commanding Officer (00)



The Commanding Officer is tasked with the responsibility for effective and economical organization and management of Medical Department RDT&E programs. The Commanding Officer has authority to fulfill the duties and obligations prescribed in current manuals, orders, regulations and directives. The Commanding Officer, at his discretion, and when not contrary to existing laws or regulations, may delegate authority to subordinates to execute assigned tasks. This delegation of authority will in no way relieve the Commanding Officer of the responsibility for the safety, well-being, and effectiveness of the Command.

In the Temporary absence of the Commanding Officer, The Executive Officer will act as the Commanding Officer. In the temporary absence of both, the Department Director next in rank and seniority, who is permanently assigned to the Command will act as the Commanding Officer.

## Special Assistants to the Commanding Officer

### Command Master Chief (00A)

- Assists and advises the Commanding Officer on all enlisted personnel matters.
- Assists and advises Echelon IV Commanding Officers and Echelon V Officers-in-Charge on enlisted personnel matters with emphasis on enlisted personnel development, distribution and utilization throughout the spectrum of RDT&E mission execution.
- Coordinates with Command Master/Senior Chiefs of the Echelon IV and Echelon V activities to ensure that morale, personnel services, and welfare are maintained at the highest possible level.
- Maintains close liaison and coordination with the Force Master Chief of the Navy Medical Department and with the Enlisted Personnel Distribution Branch of the Bureau of Naval Personnel (BUPERS).

### Special Assistant for AIS Security (00AIS)

- Serves as the Command's Automated Information Security (AIS) Officer for all matters regarding the protection of AIS, networks, and computer resources against accidental or intentional destruction, unauthorized disclosure, denial of service, and unauthorized modification.
- Ensures compliance with all applicable regulations and policies concerning the procurement and maintenance of AIS.

### Special Assistant for International Affairs (00B)

- Serves as the principal Command point-of-contact for OCONUS field activities.
- Advises the Commanding Officer on OCONUS administrative and programmatic issues.
- Coordinates OCONUS laboratory activities with appropriate State Department, Department of Defense (DoD), CNO, and BUMED officials.
- Is a collateral duty function of the Research Area Manager for Infectious Diseases.

### Special Assistant for Veterinary Medicine (00C)

- Assists and advises the Commanding Officer on veterinary medicine and animal care and use matters.
- Assists and advises Echelon IV Commanding Officers and Echelon V Officers-in-Charge on the operation of an effective animal care and use program.

- Conducts Command Inspection visits to ascertain compliance with all Federal, DoD, and Navy animal care and use regulations and guidelines.
- Maintains liaison with Office of the Chief, U. S. Army Veterinary Corps to achieve adequate veterinary personnel staffing.

### Corporate Counsel (00CC)

- Serves as an Attorney within a component office of the Office of the General Counsel of the Navy and as the principal advisor to the Commanding Officer for matters related to inventions, patents and cooperative agreements with other governmental and commercial organizations.
- Assists and advises Echelon IV Commanding Officers and Echelon V Officers-in-Charge on matters related to inventions, patents and cooperative agreements with other governmental and commercial organizations.
- Provides legal advice and services to NMRDC Offices and the offices of the subordinate commands on various issues arising from the operation of a medical research program.

### Special Assistant for Public Affairs (00P)

- Develops, writes, edits, and supervises all stages of the preparation of promotional and recruiting materials for the Command and its subordinate laboratories. These materials include a regularly published Newsletter, and various feature articles on subjects related to the programs or operation of the Command or its subordinates.
- Develops and updates as necessary, Command briefing packages and Annual Reports to sponsors.
- Assists in the planning and arrangements for Command meetings, conferences and functions.
- Serves as the principal Command point of contact for interactions with the news media and general public regarding the programs of the Command. Acts as liaison with the Public Affairs Offices of other Navy and governmental activities.

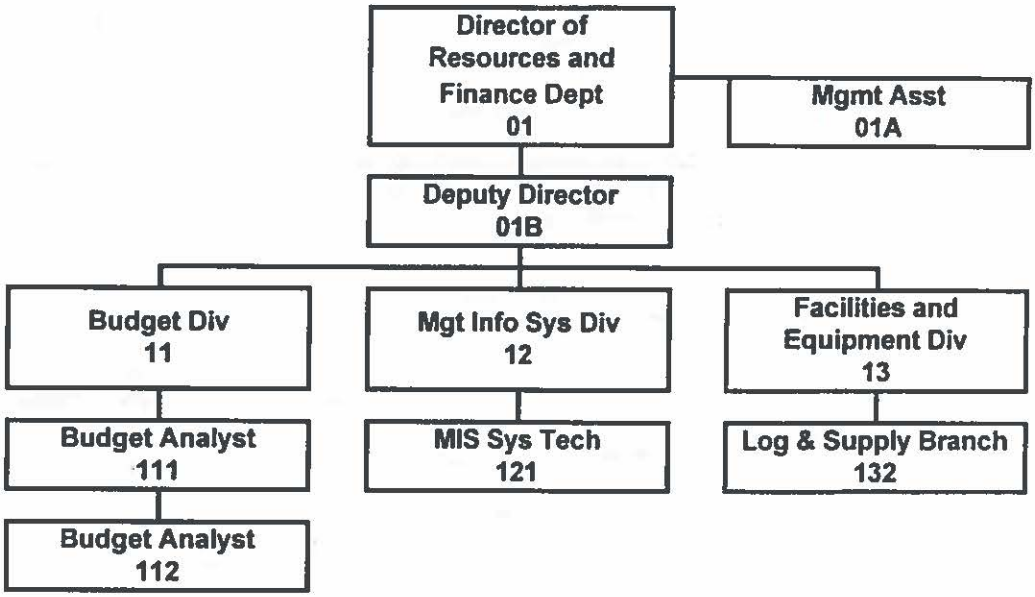
### Special Assistant for NAVOSH (00S)

- Advises the Command on oversight responsibilities to ensure that Echelon IV and V commands are in compliance with Navy Occupational Safety and Health Inspection (NOSHIP) deficiency abatement programs.
- Advises subordinate commands on matters pertaining to Navy Occupational Safety and Health (NAVOSH).
- Reviews and consolidates subordinate commands' NAVOSH and NOSHIP reporting requirements with a focus on identifying trends for actions required in support of laboratory safety and health programs.
- Serves as the Command Safety Officer.

### Office of the Executive Officer (09)

- The primary function of the Executive Officer is to assist and advise the Commanding Officer in all matters that pertain to the mission of the Command. All orders issued by the Executive Officer shall be regarded as proceeding from the Commanding Officer and shall govern all persons within the Command.

## Office Of The Director Of Resource Management And Finance Department (01)




### Director of Resource Management/Comptroller (01)

- The Director of Finance/Comptroller reports directly to the Commanding Officer through the Executive Officer, and serves as the principle staff advisor to the Commanding Officer in the interpretation of guidance from higher authority to effectively direct, manage, and coordinate the provision of financial, and manpower resources for the headquarters and subordinate commands. Assists the Commanding Officer in monitoring and managing subordinate commands and activities in the areas of resource allocation, facilities and supply matters. Advises and assists the Commanding Officer in responding to higher authority concerning budgets and the execution of resources.
- Appointed in writing as the Command Allotment Administrator and acts as Program Element Manager for RDT&E,N Program Element 65861, "Management Support" and "65862 Naval Medical Instrumentation & Material Support".
- Organizes approved financial plans into fiscal programs and provides recommendations on major alternatives using financial data to enhance the program decision process and insure maximum use of available resources.
- Prepares the Medical Department RDT&E budget by coordinating fund estimates and justifications for resources.
- Develops and maintains budgetary data acquisition and retrieval systems.
- Maintains fiscal controls based on reprogramming actions.
- Maintains liaison with organizations involved in RDT&E budget formulation and execution i.e. CNO, Office of Naval Research (ONR), and BUMED.
- Monitors field activity performance for compliance with proposed financial plans and recommends funds authorization adjustment as necessary.
- Provides BUMED-01 with programming data for RDT&E projects that will become operational and affect O&M,N funding.
- Manages manpower functions related to budget formulation and execution which include: management of total force manpower allowances, coordination of program objectives memorandum (POM) issues, manpower change requests, manpower issues in conjunction with commercial activities (CA), efficiency review (ER) programs and staffing standards.

- Oversees and coordinates the maintenance of civilian time and attendance records, submission of these records to Naval Regional Finance Center, and assistance of employees in interactions with Finance Center personnel regarding leave and pay issues.

### Management Assistant to the Director of Resource Management and Finance Department (01A)

- Provides administrative support to the Director, Deputy Director and Budget Analysts for the Resource Management and Finance Department. Provides administrative support for the Director and the AIS Systems Technician of the Automated Information Systems Division, and the Director of the Facilities and Equipment Management Division.

### Deputy Director of Resources and Finance Department (01B)

- Supervises personnel assigned to the Department.
- Assumes the duties and responsibilities of the Director when the Director is absent from the Command. When acting in that capacity, the Deputy shall have full authority to function on behalf of the Director.
- This position will normally be a collateral assignment of the Budget Officer.

## Budget Division (11)

### Budget Officer (11)

- Coordinates and analyzes program planning documents from higher authority, assembles medical RDT&E planning data and submits required SYDP input.
- Translates approved programs into a financial plan and formulates annual supplemental and special estimates for submission by the Commanding Officer.
- Requests estimates of fiscal requirements from field activities and program managers, reviews and analyzes their response, and prepares budgets estimates, special exhibits, justification material as directed by higher authority.
- Maintains status of funds control in the budgetary execution process.
- Responsible for the management of Managing to Payroll policy for the Command and the subordinate activities.
- Supervises personnel assigned to the Budget Division.
- Serves as the Naval Medical Research and Development Command Timekeeper, and maintains all records associated with this position.

### Budget Analysts (111) and (112)

- Coordinates and analyzes program planning documents, assembles medical RDT&E planning data for review by budget officer.
- Translates approved programs into a financial plan and formulates annual supplemental and special estimates for submission to the Budget Officer.
- Requests estimates of fiscal requirements from field activities and program managers, reviews and analyzes their response, and prepares budgets estimates, special exhibits, and budget justification materials.
- Maintains status of funds control in the budgetary execution process.

## Automated Information Systems Division (12)

### Director Automated Information Systems Division (12)

- Manages all Automated Information Systems (AIS) for the Command.
- Directly manages AIS functions including the development of policies and programs involving the procurement, distribution, utilization and maintenance of AIS equipment.
- Serves as the Command AIS Security Officer.

### AIS Systems Technician (121)

- Provides AIS technical support to all departments.

## Facilities and Equipment Management Division (13)

### Director of Facilities and Equipment Management (13)

- Acts as Assistant Program Element Manager for RDT&E,N Program Element 65862N, "Navy Medical Instrumentation and Material Support."
- Manages the facilities planning, programming, and budgeting actions. Monitors program execution for Military Construction, Facilities Special Projects and the Shore Facilities planning System.
- Serves as liaison with NNMC Public Works Division for NMRDC required alteration, construction, or repair special projects, excluding routine repair and maintenance trouble calls.
- Assists the Administrative Officer with NMRDC space assignments and any facility alterations and utility service changes.
- Manages the general purpose equipment planning, programming, and budgeting actions. Monitors program execution of equipment procurement, utilization, and redistribution. Justifies and initiates procurement of general purpose equipment for NMRDC.
- Manages, coordinates and directs the provision of supply and logistics support to the Command, ordering and processing the delivery of non-expendable supplies, maintaining the Plant Property and Minor Property Accounts, and obtaining and managing the stock of expendable supplies for the Command.
- Directs all operating management support for the efficient operation of the facilities of the Command including space utilization management, provision and service of utilities in the Command offices, management and coordination of necessary minor repairs to utilities or equipment. This office has primary responsibility for general coordination with the host Command for services provided under the Host/Tenant agreement.
- Provides necessary coordination for the submission for information, or the proper review and approval of manuscripts generated in the subordinate laboratories.
- Manages the Information System Program (ISP) for NMRDC and subordinate activities. Serves as liaison with Naval Medical Information Management Center (NMIMC) for RDT&E automated data (ADP) processing matters. Serves as the Executive Agent for NMRDC ISP Policy Board, the NMRDC ADP Security Officer and the manager of in-house ADP assets.

## Facilities and Equipment Division (13)

### Facilities and Equipment Management Branch (131)

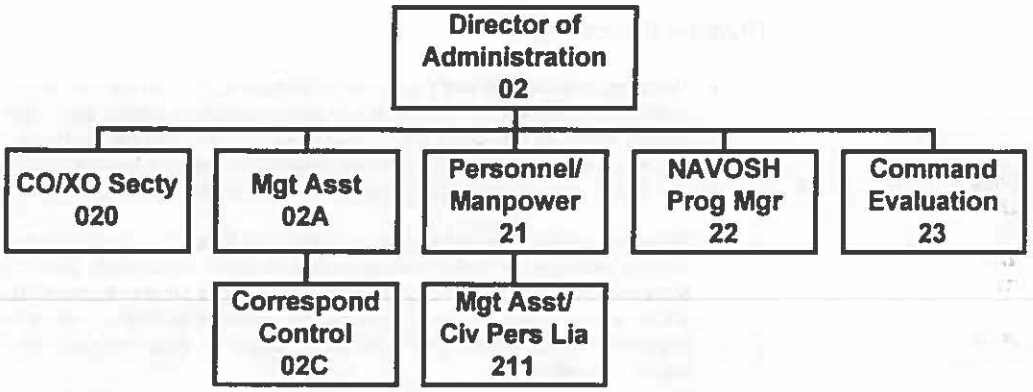
- Assists the Director of Facilities and Equipment Management in the management and oversight of facilities, equipment, and information systems, with primary emphasis on facilities planning.

- Assumes the duties and responsibilities of the Director in his absence. As the acting Director, He/she shall have full authority to function in behalf of the Director in all facilities, equipment, and information system matters.

### Logistics and Supply Branch (132)

- Provides supply and logistics support to the Command, ordering and processing the delivery of non-expendable supplies, maintaining the Plant Property and Minor Property Accounts, and obtaining and managing the stock of expendable supplies for the Command.
- Provides operating management support for the efficient operation of the facilities of the Command including space utilization management, provision and service of utilities in the Command offices, management and coordination of necessary minor repairs to utilities or equipment. Provides general coordination with the host Command for services provided under the Host/Tenant agreement.

## Office Of The Director Of Administration (02)




## Director of Administration (02)

The Director for Administration provides a full range of administrative, personnel and managerial guidance for the entire Command and subordinate activities. The Director for Administration is the principal staff advisor to the Commanding Officer, Executive Officer, other Directorates, and subordinate commands for all matters, related to the Command Personnel and Administrative Management; provides administrative and organizational guidance in all administrative management matters, including general administration, personnel administration, disciplinary/legal proceedings, correspondence and records management, recurring reports, command organization, and manpower management. The Director for Administration serves as the Command Security Manager. The Directorate for Administration consists of the Personnel Division.

### Commanding Officer's Secretary (020)

- Serves as the executive secretary for the Commanding Officer, Executive Officer and the Command Master Chief.

### Management Assistant (02A)

- Supervises the management of the Command Correspondence Control and Command Records System.
- Provides administrative support to the Director of Administration.

- Serves as the custodian of Command classified materials.

### Correspondence Control (02C)

- Manages the Command Correspondence Control and Command Records Systems. Provides advice and assistance to the Command on all matters pertaining to the receipt, tracking and processing of all Command correspondence, message traffic and the maintenance of necessary Command files.
- Manages and maintains the Command Directives System.
- Oversees the operation of the general office functions of the Command.
- Processes all military leave, military pay and disbursing actions.
- Updates and maintains the Standard Personnel Management System (SPMS) for the Command and subordinate commands.

## Personnel Division (21)

### Division Director (21)

- Manages, coordinates and directs administrative support to the Command for all military personnel matters including the maintenance and administration of military personnel records, processing of military leave, all aspects of the administration of travel and travel claims, military pay and disbursing actions, processing of military awards, coordination of transfers and other actions with the Bureau of Naval Personnel (BUPERS), and other routine personnel correspondence and actions.
- Manages, coordinates and directs administrative support to the Command for all civilian personnel matters including the civilian personnel classification, recruitment, promotion or termination processes; coordination of civilian employee relations programs; processing of civilian evaluations and incentive awards, processing of routine civilian personnel actions, training activities, and implementing various Navy-wide personnel programs in coordination with BUMED and other appropriate offices.
- Advises the Commanding Officer and subordinate commands on policies and procedures that govern the assignment, distribution and utilization of officer, enlisted and civilian personnel.
- Maintain liaison and close coordination with BUPERS and BUMED on matters which affect the assignment and distribution of military personnel.
- Evaluates field activity Position Management Programs and develops recommendations to improve their position management performance.
- Manages the Command's mobilization planning and contingency readiness program, reviewing all documents from fields activities, and responding to requirements of higher authority as necessary.

### Management Assistant/Civilian Personnel Liaison (211)

- Coordinates the administrative support to the Command for all military personnel matters, including:
  - All necessary coordination with the Personnel Support Detachment, Bethesda for the maintenance and administration of military personnel records, all aspects of the administration of travel and travel claims.
  - All internal Command support to attached personnel and personnel of the subordinate laboratories for processing of military awards, coordination of transfers and other actions with the Naval Military Personnel Command, and other routine personnel correspondence and actions.
- Manages, coordinates and directs administrative support to the Command for all aspects of civilian and military Temporary Additional Duty travel including the preparation of orders; country clearance procedures, where required; and the necessary interactions with the Personnel Support Detachment, Bethesda for obtaining tickets and advanced per diem and for the processing of travel claims.

- Coordinates the administrative support to the Command for all civilian personnel matters, including:
  - All necessary coordination with the Human Resources Office, Washington (HRO-W) for administration of the civilian personnel classification, recruitment, promotion or termination processes; coordination of civilian employee relations programs; and processing of civilian evaluations and incentive awards.
  - All internal Command support to civilian employees of the Command and those of the subordinate laboratories for processing of routine civilian personnel actions, training activities, and implementing various Navy-wide personnel programs in coordination with BUMED and other appropriate offices.
- Provides administrative support to the division Director.

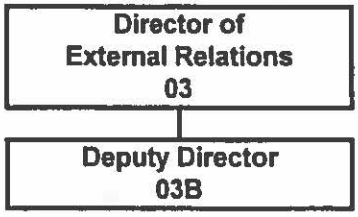
### NAVOSH Program Manager (22)

- Advises the Command on oversight responsibilities to ensure that Echelon IV and V commands are in compliance with Navy Occupational Safety and Health Inspection (NOSHIP) deficiency abatement programs.
- Advises subordinate commands on matters pertaining to Navy Occupational Safety and Health (NAVOSH).
- Reviews and consolidates subordinate commands' NAVOSH and NOSHIP reporting requirements with a focus on identifying trends for actions required in support of laboratory safety and health programs.
- Serves as the Command Safety Officer.

### Command Evaluation Division (23)

- Manages, coordinates, and directs the Management Control, Command Evaluation, and Naval Command Inspection programs of the headquarters command and field activities. Provides advice and assistance to the Command on all matters pertaining to these programs.
- Coordinates and conducts management control reviews on programs/functions with potential for waste, fraud, and abuse.
- Evaluates the effectiveness of field activities Management Control, Command Evaluation, and Naval Command Inspection programs. Develops recommendations in response to noted program deficiencies and ensures that corrective actions are implemented in a manner consistent with the intent of stated recommendations.
- Coordinates and tracks field activity responses to Command Inspection Team recommendations and monitors compliance with all external review and inspection processes of NMRDC field activities.
- Advises Echelon IV and Echelon V command on matters pertaining to the Command Evaluation, Management Control, and Naval Command Inspection programs.

## External Relations Department (03)



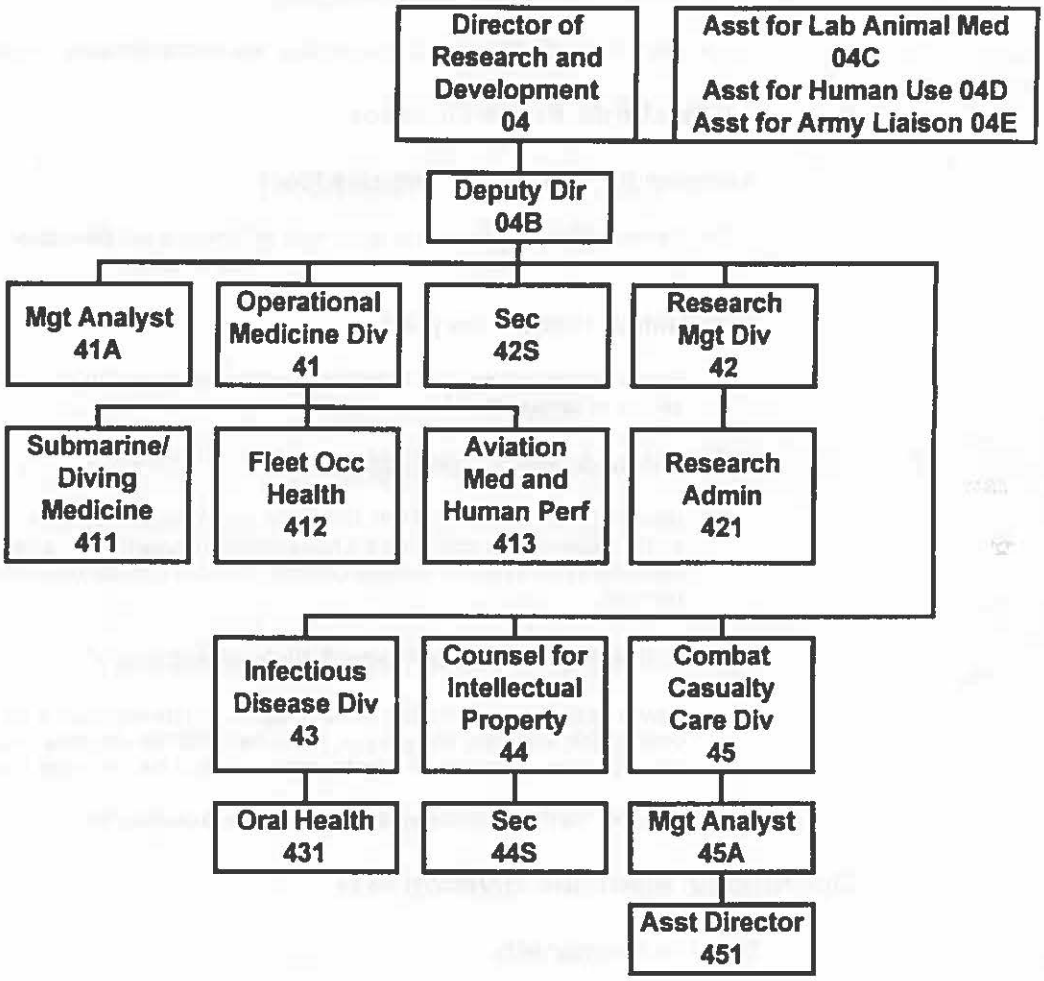
## Director of External Relations Department (03)

- Serves as the Command point of contact for all issues regarding the long-range and strategic planning of the Command's RDT&E programs, external relations with military and civilian agencies, and the integration of these plans with the total operations of the headquarters and the individual laboratories.
- Analyzes current Navy medical needs, and the ability of NMRDC to meet those needs through in-house and contract programs and within the constraints of projected resources and scientific capabilities. Develops and maintains the currency of the Command's long-range corporate goals and marketing objectives for the research program, and provides direction and guidance to the laboratories in the development of their individual long-term plans.
- Defines, plans and facilitates the appropriate integrations of biomedical aspects of advanced and developing Navy weapons systems in NMRDC programs, and coordinates these programs with other Navy and Contract RDT&E organizations.
- Serves as the Command liaison with the DoD Laboratory and Research Center community, the Navy requirements and technical communities, the academic engineering community, the Fleet, and industry.
- Serves as the Command representative to the Navy Science Assistance Program (NSAP), to ensure the timely transfer of pertinent Fleet operational problems to the biomedical research community, and to facilitate full NMRDC and laboratory response to these issues.
- Serves as the Command representative for legislative affairs.
- Serves as the Command point of contact for technology transfer.

## Deputy Director of External Relations (03B)

- Plans and develops a wide variety of reports, briefs and publications concerning the activities of the Command and its laboratories.
- Develops informational and communication marketing strategies for program sponsors and external customers.
- Monitors the media for issues pertaining to medical research and development.
- Serves as the Special Assistant for Public Affairs.

## Office Of The Director Of Research And Development (04)




### Director of Research and Development (04)

- Directs the development, management, evaluation and documentation of in-house and contract RDT&E programs in response to identified Navy and Marine Corps needs and requirements.
- Formulates budgets for Research, Exploratory Development, Advanced Development and Engineering Development programs.
- Exercises research program quality control and assures responsiveness to RDT&E needs through the establishment, management, and support of review panels and technical workshops.
- Directs the preparation of briefing material and program documentation required by higher authority.
- Initiates and maintains scientific liaison and coordination with other governmental and non-governmental organizations with the purpose of achieving program coordination, avoiding duplication and exploiting existing R&D capabilities to meet Navy needs.

- Reviews and approves in-house and contract RDT&E proposals.
- Develops scientific and technical instructions and guidelines for in-house and contract research and development.
- Acts as the Scientific Program Element Manager for all RDT&E,N 6.1 through 6.4 assigned Program Elements.
- Prepares responses to Congressional inquiries and DoD-organized apportionment issues on research program content and funding levels.
- Formulates scientific and technical management recommendations for the Commanding Officer.

## Special Assistants to the Director

### Assistant for Lab Animal Medicine (04C)

- Serves as principal assistant to the Director of Research and Development on all laboratory animal medicine issues and the use of laboratory animals in research.

### Assistant for Human Use (04D)

- Serves as principal assistant to the Director of Research and Development on all issues related to the use of humans in research activities.

### Assistant for Army Liaison (04E)

- Serves as the liaison officer to the U. S Army (USA) Medical Research and Development Command and is responsible for integrating the Navy scientific program areas where the USA serves as executive agent for DoD (Infectious Disease, Chemical and Biological Warfare Defense, and Combat Dentistry.)

### Deputy Director for Research and Development (04B)

- Serves as the Deputy to the Directo. of Research and Development in the near-term planning, coordination, execution, and analysis of Command RDT&E programs; and for the establishment of new programs. Participates fully in the maintenance of the Command Strategic Plan.
- Assumes the duties of the Director of Research and Development in the absence of that official.

## Operational Medicine Division (41)

### Division Director (41)

- Directs the planning and administration of research and development efforts involving operational medicine areas.

### Management Analyst (41A)

- Provides program and administrative support to the Operational Medicine Division.

### Research Area Manager, Submarine and Diving Medicine (411)

- Coordinates the planning and administration of research and development efforts that involve the unique medical aspects of submarine and diving operations in support of specific underwater operational goals.
- Coordinates the medical RDT&E diving and submarine program with naval requirements.
- Maintains liaison with the appropriate officials of the BUMED, CNO, Naval Sea Systems Command, ONR, Office of Naval Technology, and other activities concerned with underwater technology.

- Monitors in-house and contract programs in submarine and diving medicine, and advises laboratories on requirements and priorities.
- As an appointed DON representative, serves as an active participant in international scientific exchanges and cooperation agreements involving diving and submarine medical research and development.
- Assists the Research Area Manager for Aerospace Medicine and Human Performance (NMRDC-44) in the Joint Technology Coordinating Group (JTCG) for Human Systems Technology in the area of Environmental Physiology.

### Research Area Manager, Fleet Occupational Health (412)

- Coordinates the planning, development, support, and administration of medical research in characterizing and evaluating occupational hazards from chemical, physical, and biological stresses in operational environments (including heat, noise, vibration, including laser produced radiation), determining human exposure limits and developing effective measures for personnel protection.
- Responsible for coordination of all phases of Navy-unique medical research in chemical warfare defense.
- Provides centralized integration and coordination of the Navy's Biological Effects of Electromagnetic Radiation Program.
- Maintains liaison with related command research programs, BUMED, ONR, subordinate laboratories and other government department and agencies.
- Monitors in-house and contract RDT&E programs for these areas and advises field activities on research requirements and priorities.
- Serves as the Navy representative to the JTCG for Chemical Warfare Defense for the Armed Services Biomedical Research Evaluation and Management (ASBREM) Committee.
- Assists NMRDC-44 in the JTCG for Human Systems Technology Coordinating Group for Human System Technology in the areas of Non-ionizing Radiation Bioeffects and Chemical Toxicology.

### Research Area Manager, Aerospace Medicine and Human Performance (413)

- Coordinates planning and administration of life science research and development on human performance effectiveness in operational systems and environments of the naval service, including: work on the measurement and prediction of human performance under operational stresses (e.g., motion, sustained operations, thermal, noise, acceleration/impact, heavy workloads, etc.) of naval systems from which to develop human factors criteria for medical selection, training, engineering, work procedures; and performance maintenance/enhancement; work on the behavioral and psychological dimensions of health and safety under operations and stressful duties of naval service from which to develop criteria for medical screening and safety standards; and biomedical/biomechanical intervention techniques to maintain and/or enhance mental and physical performance in adverse operational settings.
- Maintains technical liaison with; CNO, BUMED, ONR, NMPC, Naval System Command, as well as those of the Departments of the Army and Air Force, and other government agencies, for matters pertaining to aerospace medicine and human performance.
- Coordinates the planning, development, and administration of RDT&E projects in the multiple fields and disciplines associated with aviation medicine and human performance.
- Monitors in-house and contract aviation medicine and human performance R&D programs and keeps performing organization advised as to requirements and priorities.

## Research Management Division (42)

### Division Director (42)

- Prepares major financial/ program documentation including annual inputs to the Program Objectives Memorandum (POM) and Six Year Defense Plan (SYDP) processes, the annual Budget and Apportionment Reviews, the Claimant Program Proposal, the Block Program Plan, and the Congressional RDT&E Descriptive Summaries. Assists in the preparation, and manages the recording of changes, of budgetary allocations to individual program efforts.

- Formulates options and recommendations on overall RDT&E program objectives, policies, and scope/direction for strengthening existing programs; recommends approval/disapproval of individual in-house and contract proposals and the allocation of funds to competing projects. Directly manages the NMRDC Independent Research Program and the unique processes associated with this program.

- Develops and implements procedures for, and oversees the operation of, the review of program progress including the use of in-house reviews, outside Scientific Peer Review Panels, and specific program consultant reviews.

- Organizes, provides guidance/direction, and coordinates the development and presentation for competitive funding of major new research program initiatives (such as Accelerated Research Initiatives and Advanced Technology Demonstrations) in biomedical areas.

- Serves as the Associate Technology Base Manager and as the Associate Block Program Manager for the Medical CBR Defense and Biomedical Technology Programs. Acts as a primary spokesperson and representative of NMRDC programs to Navy and DoD R&D communities.

### Research Administrator (421)

- Records, routes, tracks, numbers, files, and sets internal procedures for DD 1498's.

- Maintains and disseminates information on current DTIC policies and procedures, submits DD 1498's to DTIC, and searches DTIC databases.

- Administers NMRDC publication library and Quarterly Listing/Mailing systems.

- Prepares/coordinates preparation of NMRDC program documentation.

- Facilitates technology transfer.

### Secretary to Research Management Division Director (42S)

- Receives visitors/telephone calls and incoming Code 04 correspondence.

- Prepares correspondence and NMRDC program documents/reports.

- Uses automated data processing equipment to generate financial plans and presentation graphics.

- Maintains files and provides administrative support to NMRDC Code 04.

## Infectious Disease Division (43)

### Division Director (43)

- Coordinates with the Research Area Manager, US Army Liaison (NMRDC-46) for the planning, development and administration of RDT&E directed toward the epidemiology, immunology, rapid diagnosis, treatment, vaccine development and control of infectious diseases of military importance.

- Maintains liaison with BUMED, Navy Environmental Health Center, Marine Corps, the Uniformed Services University of the Health Sciences, ONR, Office of Naval Technology, the Armed Forces Epidemiological Board, the Armed Forces Pest Management Board, and the National Institute of Allergy and Infectious Diseases.

- Monitors the in-house and contract infectious diseases RDT&E program and keeps performing organizations advised as to requirements and priorities.

- Serves as Navy representative on selected U.S. Navy, tri-service, and international committees, as appointed, to coordinate R&D in the thrust areas of aviation medicine and human performance research.

- Serves as the Navy representative on JTCG for Human System Technology for ASBREM committee to coordinate joint service issues in RDT&E in the six areas of: Mechanical Force/Biodynamics, Non-ionizing Radiation Bioeffects, Personal Protective Equipment Technology, Operational Medicine/ Performance, Chemical Toxicology, and Environmental Physiology.

### Oral Health Program Manager (431)

- Reports to the Director of Research and Development (Code 04). Develops research sponsorship , research requirements, provides guidance to our performers, and documents and briefs required, to our customers.

- Collaborates with the performing activities to evolve a research program which is scientifically excellent, responsive to Navy needs and requirements, and which is executable and viable in the evolving political and economic environment.

- Ensures programs are coordinated across the various funding sources and performers.

## Counsel for Intellectual Property (44)

### Counsel for Intellectual Property (44)

- Serves as an Attorney within a component office of the Office of the General Counsel of the Navy and as the principal advisor to the Director of Research and Development for matters related to intellectual property and cooperative agreements with other governmental and commercial organizations.

### Secretary to Counsel for Intellectual Property (44S)

- Provides Administrative support to the Counsel for Intellectual Property.

## Combat Casualty Care Division (45)

### Division Director (45)

- Coordinates the planning, development and administration of RDT&E efforts directed toward improved treatment and care of casualties in combat environments.

- Monitors in-house and contract RDT&E requirements and priorities.

- Maintains liaison with the appropriate organizational codes of BUMED, ONR, Naval Sea System Command, Marine Corps, laboratories under the control of the Space and Naval Warfare Systems Command, Army Medical Research and Development Command, the Air Force Aerospace Medical Division, National Institutes of Health and other government agencies to facilitate management and execution of research area responsibilities.

- Serves as the Navy representative on JTCG for Combat Casualty Care for ASBREM committee to coordinate RDT&E in the thrust areas of: burns and trauma, shock and sepsis, blood and blood substitutes, combat care in extreme environments, and combat medical material.

- Serves as an appointed U.S. Navy representative as U.S. Project Officer for Annex No. MWDDBA-N-71-G-4209 "Blood Research" of Defense Development Exchange Program in DoD and Armed Services Blood Program Office.

### Management Analyst (45A)

- Provides program and administrative support to the Division Director and Assistant Research Area Managers for the Combat Casualty Care Division.

### Assistant Research Area Manager, Combat Casualty Care (451)

- Coordinates the planning, development and administration of RDT&E efforts directed toward improved treatment and prevention of disease and emergencies, and the care of combat casualties.
- Assists in the management and oversight of Combat Casualty Care Research Programs.
- Assumes cognizance over Combat Casualty Care Program matter when the Research Area Manager is absent from the Command.

### Assistant Research Area Manager, Combat Casualty Care (452)

- Coordinates the planning, development and administration of RDT&E efforts directed toward improved treatment and prevention of disease and emergencies, and the care of combat casualties.
- Assists in the management and oversight of Combat Casualty Care Research Programs.